The
Calcutta Journal
of
Natural History.

VOL-4
1843

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THE
CALCUTTA JOURNAL
OF
NATURAL HISTORY.

[Reprint of Dr. William Jack's writings, continued from No. 13, page 62.]

XVIII. LEGUMINOSÆ.

BAUHINIA EMARGINATA. *(W. J.)*

Foliis cordatis subrotundo-ovalibus glaberrimis acumine brevi obtuso emarginato, floribus octandris, staminibus tribus superioribus fertilibus.

Dadaub, *Malay*.

Native of Sumatra.

A strong woody climber. *Leaves* alternate, petiolate, cordate, subrotund-oval, terminating in a short blunt emarginate acumen, very entire, 4 inches long, 7—9 nerved with reticulate veins, very smooth. *Petioles* rather short. *Cirrhi* long, simple, revolute. *Racemes* terminal or sometimes lateral, corymbose, many flowered; pedicels long, tomentose. *Calyx* five parted, tomentose, bursting into two or three segments. *Corolla* large, five petalled, spreading, petals nearly equal, unguiculate. *Stamina* eight; three superior fertile, longer, with large two-lobed anthers; four inferior short, with small

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abortive anthers; the fifth and lowest being a little longer, and entirely sterile. *Ovary* tomentose. *Style* about the length of the fertile stamina. *Stigma* peltate, round.

Obs.—The form of the leaf is very peculiar, and readily distinguishes this species from the others.

BAUHINIA BIDENTATA. *(W. J.)*

Foliis cordatis acuminatis apice bidentatis glaberrimis, corymbis terminalibus, floribus octandris, staminibus tribus superioribus fertilibus.

Native of the Malayan forests where it climbs over trees, and shews its flame coloured blossoms on their very summits.

Shrubby, climbing far over the trees in its neighbourhood; *bark* brown; *branches* round, flexuose; *branchlets* covered with ferruginous tomentum. *Leaves* alternate, petiolate, cordate, acute, bifid at the point, (not two-lobed) divisions approximate with a short thread interposed, very entire, seven nerved, very smooth, the younger ones rather silky beneath with ferruginous deciduous hairs. *Petioles* thickened at the top and base. *Tendrils* simple, revolute. *Corymbs* terminal. *Pedicels* clavate, striated, tomentose. *Calyx* five-parted, tomentose, for the most part bursting irregularly into three divisions. *Corolla* orange-colored, becoming red after expansion, five-petalled, petals nearly equal, sub-rotund, unguiculate, spreading. *Stamina* eight, ascending, of which the three upper are longer and fertile, and the three lowest short and sterile. *Anthers* sub-rotund. *Ovary* pedicellate, compressed, oblong, containing from six to eight ovula. *Style* declinate, incurved at the point. *Stigma* large, capitate and glutinous.

Obs.—This species is at once distinguished by the peculiar form of the leaves which are not two-lobed as usual in the genus, but have the apex divided, so as to make the leaf terminate in two acute points. The flowers are large and shewy.

JONESIA DECLINATA. *(W. J.)*

Foliis 6-8 jugis, foliolis oblongis, floribus fasciculato-paniculatis tetrandris.

Kayu Siturun. *Malay.*

A small straggling tree found generally in thickets, native of Sumatra.

Branches depending, whence the native name. *Leaves* alternate, composed of from six to eight pair of leaflets, of which the lowest are situated on the base of the petiole; they are opposite, from ten to twelve inches in length, oblong, rounded at the extremity, but terminating in a short thick recurved point, entire on the margin, smooth. *Petiole* roundish, thickened at the base. *Stipule* intrapetiolar, embracing the stem, broad at the base, ovate and pointed. *Flowers* in lateral fasciculate panicles; two subrotund bracts below each flower; pedicels slender; the whole very smooth and delicate, and of a light semi-transparent red colour. *Calyx* reddish yellow, tubular; tube narrow; limb four-parted, flat, segments subrotund, about the same size as the bracts. *Corolla* none. *Stamina* four, more than twice the length of the calyx and inserted on its tube, their upper part deep red. *Anthers* deep purple, subrotund, two-celled, each cell streaked with white. There are no rudiments of abortive stamina. *Germen* pedicellate, pedicel accrete to the tube of the calyx. *Style* long, red. *Stigma* round. *Legume* pedicellate, flat, compressed, containing several seeds.

The large branches of delicate flesh-colored flowers render this a very beautiful shrub during the period of inflorescence.

MIMOSA JIRINGA.

Arbor inermis, foliis conjugato-pinnatis, foliolis 3-jugis glaberrimis, paniculis fasciculatis axillaribus, capitulis paucifloris, leguminibus maximis articulato-contortis nigris.

Mimosa Djiringa. *Roxb: Hort: Beng: p. 93.*

Bua Jiring. *Malay.*

Pulo Pinang, Malacca, &c.

A lofty tree, unarmed, with grey bark and round smooth branches. Leaves alternate, conjugato-pinnate, leaflets three-paired, on short thick pedicels, ovate lanceolate, obtusely acuminate, very entire, very smooth, the upper pairs larger. Petioles round somewhat keeled above. An indistinct gland above the base of the common petiole. Capitula few flowered, panicled; these panicles are fasciculate, axillary, or in the axils of fallen leaves. Flowers white. Calyx 5-toothed. Corolla twice as long as the calyx, 5-cleft. Stamina numerous, monadelphous, long, fertile. Style as long as the stamina. Legumes solitary, very large, almost black, about a foot in length, spirally contorted, articulate, two-valved, articulations subrotund, one-seeded, convex and prominent on both sides. Seeds large, subrotund, double convex.

This species belongs to the genus Inga of Willdenow.

INGA BUBALINA. *(W. J.)*

N. O. Mimoseæ. Br:

Inermis, foliis conjugato-pinnatis, foliolis bijugis glaberrimis, capitulis paucifloris paniculatis, paniculis axillaribus et terminalibus, legumine recto cylindrico.

Bua Karbau. *Malay.*

Sumatra, &c.

A tree, unarmed, with grey bark. *Leaves* alternate, conjugato-pinnate, leaflets two paired, ovate, with rather an obtuse acumen, very entire, very smooth, nerves lucid; the upper pair of leaflets the largest. *Primary petiole* short, thickened at the base, bearing a gland at the point; secondary petioles without glands. *Capitula* few-flowered, panicled. *Panicles* axillary and terminal, peduncled, divaricate, shorter than the leaves. *Bracts* small. *Calyx* shorter, tubular, 5-dentate. *Corolla* white, much longer than the calyx, campanulate, 5-parted, segments spreading. *Stamina* many, monadelphous at the base, long and white. *Style* filiform, as long as the stamina. *Ovary* pedicellate. *Legume* dark green, straight, cylindrical, about 4 inches long, thick, obtuse, many-seeded, fetid. *Seeds* crowded, orbicular, piled one above the other, and thus flattened above and below by their mutual compression.

Obs.—This species is nearly allied in habit and inflorescence to the *Inga Jiringa, Mal. Misc. Vol. I.* but differs in the shape of the legume, which has a very offensive smell, but is eaten by the natives in the same manner as that of the Petek *(Acacia graveolens, W. J.*)* Karbau in Malay signifies the Buffalo, whence the specific name.

INGA CLYPEARIA. *(W. J.)*

Inermis, ramulis acutangulis, foliis bipinnatis, foliolis 10-jugis rhomboideis subtus tomentosis, paniculis terminalibus, leguminibus contortis rubris.

Clypearia rubra. *Rumph: Amb: III. p.* 176, *t.* 112.

Jiring muniet. *Malay.*

A large tree. *Branchlets* smooth, acutely five-angled, almost winged. *Leaves* alternate, bipinnate; pinnæ about four pair; leaflets about ten pair, rhomboidal, inequilateral, rather acute, entire, smooth above, tomentose or silky and glaucous beneath, they are of unequal size, the uppermost often two inches long. *Petiole* or rachis acutely 4 or 5-angled, thickened at the base, eglandular. *Panicles* large, terminal; peduncles fascicled. *Flowers* white, pedicellate, in small capitula or heads. *Calyx* small, five-parted. *Corolla* much longer than the calyx, quinquefid. *Stamina* numerous, monadelphous at the base. *Style* one. *Legume* red, flat two-valved, spirally contorted, containing many subrotund somewhat compressed black seeds.

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* Parkia R. Br.

Obs.—This species which agrees with that described by Rumphius, is found in forests in the neighbourhood of Bencoolen, but I am not aware that it is there put to any particular use. These two species together with the *I. Jiringa* might perhaps with equal propriety be referred to Acacia, as the seeds are not arilled, though the legume (as in *I. bubalina*) is fleshy and esculent; the stamina are those of Inga, and the paniculate inflorescence is more frequent in that genus than in Acacia. The distinction between these two sections of the Linnean genus Mimosa is an artificial one, and the characters of the present species are in some degree intermediate between the two.

XIX. CHRYSOBALANEÆ.

PETROCARYA EXCELSA. *(W. J.)*

Heptandria Monogynia. N. O. Rosaceæ. Juss:

Foliis oblongis acuminatis glabris, calycibus ore obliquis, staminibus undecim fertilibus.

Kayu Balam Pangkat. *Malay.*

A large timber tree. *Leaves* alternate, short petioled-oblong, acuminate, entire, smooth 4—5 inches long. *Stipules* longer than the petioles, deciduous. *Racemes* axillary and terminal, forming a panicle towards the top, strict, erect, little branched; flowers very short pedicelled and appressed to the principal peduncle; the whole ferruginous and tomentose. *Bracts* broad, deciduous. *Calyx* infundibular, ferruginous and tomentose, oblique at the mouth, furnished with a ring of stiff hairs which point downwards, lowest on the side to which the fertile stamina and ovary are attached, limb 5-parted subreflex. *Corolla* five-petalled, inserted on the mouth of the calyx and scarcely longer than its limb, petals subrotund. *Stamina* eleven fertile, twice as long as the petals, inserted in one phalanx along the lower edge of the mouth of the calyx, on the upper edge is a ring with eight processes or abortive stamina. *Ovary* adnate to the side of the calyx below the fertile stamina, densely pilose, disporous. *Style* lateral, inserted near the base of the ovary, as long as the stamina. *Stigma* simple. *Drupe* enclosed in the enlarged calyx which becomes adnate to it and crowned by its persistent limb; obliquely ovate, about the size of a filbert. *Nut* smooth, one-seeded, with an abortive cell generally above the fertile one. *Seed* curved corresponding to the cell, albuminous; embryo cylindrical inverse; radicle superior, clavato-cylindrical, longer than the ligulate cotyledons.

PETROCARYA SUMATRANA. *(W. J.)*

Foliis elliptico-oblongis subtus canescentibus, calycis ore regulari, staminibus septem fertilibus.

A tree. *Branchlets* pilose. *Leaves* alternate, short-petioled, elliptic-oblong, 6—8 inches long, terminating in a bluntish acumen, acute at the base, entire, the adult leaves smooth above, somewhat hoary with close short wool beneath, the younger ones covered with deciduous pubescence above, nerves prominent beneath, veins reticulate. *Petioles* about a quarter of an inch in length. *Stipules* longer than the petioles, oblong, acute. *Racemes* axillary and terminal, shorter than the leaves, tomentose; pedicels mostly three-flowered, divaricate. *Bracts* rather large, concave, at the base of the peduncles, pedicels and flowers. *Calyx* tubular or campanulate, tomentose without, pilose at the faux, which is equal and regular, limb spreading, five-parted, segments acute. *Corolla* five-petalled, white, petals inserted on the mouth of the calyx, and as long as its segments. *Stamina* fourteen, of which seven upper are fertile arranged in one phalanx, and the opposite seven abortive; filaments short, flat, anthers roundish, two-lobed. *Ovary* adnate to the upper side of the tube or calyx, pilose, two-celled; containing two erect ovula. *Style* lateral, inserted at the base of the ovary, as long as the stamina. *Stigma* capitate.

Obs.—These two species though nearly related, present abundant points of distinction. In the P. *Excelsa* the leaves are smaller, smoother, and less strongly nerved, while the flowers are larger, the racemes longer, more erect and compact, and the stamina longer and more numerous than in the P. *Sumatrana.*

XX. CONNARACEÆ.

CNESTIS EMARGINATA. (*W. J.*)

Foliolis 5—7 acuminatis apice emarginatis, racemis axillaribus paucifloris, capsulis solitariis glabris, seminis umbillico carunculâ semi-amplexo.

Found in the neighbourhood of Bencoolen.

A small tree, with weak diffuse branches. *Leaves* alternate, pinnate, leaflets 5—7, from ovate to oblong ovate, terminating in a long acumen which is emarginate at the point, entire, very smooth, the middle nerve pubescent underneath; the upper leaflet is the largest, and frequently five inches in length. *Petiole* thickened at top and bottom, almost articulate under the terminal leaflet. *Racemes* axillary, subsolitary, short, few-flowered; pedicels alternate, one-flowered; a bract at the base of each pedicel, small, tomentose as well as the peduncle. *Calyx* five-parted, smooth, persistent. *Corolla* five-petaled, petals oblong, acute. *Stamina* ten, distinct, the alternate ones shorter. *Ovaries* five, smooth, with a line of hairs along the suture. *Styles* five, shorter than the stamina. *Stigmas* emarginate. *Capsule* solitary, four ovaries aborting, embraced at the base by the thickened calyx, orange coloured, smooth, bursting on one side, containing a single black seed. *Seed* furnished at the base with a cup-shaped orange coloured fleshy caruncle which partially surrounds the umbilicus. *Embryo* inverse, without albumen.

Obs.—The umbilical caruncle in this species is similar in shape and situation to that observed in the Connarus lucidus, being smaller than usual in this tribe.

CNESTIS FLORIDA. (*W. J.*)

Foliolis 3—5, rarius solitariis, oblongo-ovatis acuminatis glaberrimis, racemis fasciculatis axillaribus, seminibus arillo subinclusis.

Confer cum Connaro santaloide, Vahl, anne eadem?

Found in Sumatra and the island of Pulo Nias.

A small tree, with somewhat rigid divaricate branches. *Leaves* alternate, pinnate, leaflets 3—5, sometimes solitary, oblong ovate, attenuated into a longish blunt acumen, very entire, very smooth, rather rigid, shining above, veins reticulate; about three inches long. *Racemes* axillary, fasciculate, slender, shorter than the leaves; the lower pedicels 3—4 flowered. *Calyx* almost five leaved, erect, tinged with red towards the base. *Corolla* five-petalled, *Stamina* ten, distinct, nearly equal; filaments flat and broader at the base. *Ovaries* five, oblong, erect. *Styles* one to each ovary. *Stigmas* simple. *Capsule* solitary, the remainder aborting, ovate, pointed towards both ends, somewhat oblique, smooth, bursting on one side, one-seeded. *Seed* almost enclosed in a bright red fleshy aril originating from the umbilicus, and in its expansion enveloping the whole seed. *Albumen* none. *Cotyledons* plano-convex, solid. *Radicle* remote from the umbilicus as in Gærtner's Omphalobium.

CNESTIS MIMOSOIDES. (*W. J.*)

Foliis pinnatis subdecemjugis, foliolis ovali-oblongis emarginatis, seminibus arillo subinclusis.

Connarus mimosoides. *Vahl* and *Willd.*

Found at Tappanuly.

I can scarcely entertain a doubt of this being the very plant referred by Vahl to Connarus, and aptly named mimosoides. Its analogy with the preceding is very close, having the seeds similarly enclosed in a large red aril, and the racemes axillary. I have not seen the flowers, but the four abortive ovaries are quite distinct at base of the perfect one. In all these three species only one capsule ripens, in which particular, as well as having smooth capsules and arilled seeds, they seem to differ from Cnestis.

EURYCOMA. *(W. J.)*

Pentandria Monogynia. N. O. Connaraceæ. Brown.

Calyx 5-partitus. *Corolla* 5-petala. *Stamina* quinque. *Glandulæ* decem staminibus alternae. *Ovarium* 5-lobum, lobis monosporis. *Stylus* 1. *Stigmata* quinque. *Capsulae* 3—5, folliculares, glabrae, monospermae. *Semen* nudum.

Polygama, foliis pinnatis fastigiatis, floribus paniculatis.

EURYCOMA LONGIFOLIA.*

Kayu Kabal. *Malay.*

Found at Tappanuly and Bencoolen in Sumatra, and at Singapore. *Mergui. Malacca.*

This is a small tree, whose branches are thick, rough with the vestiges of fallen leaves and foliose at their summits. *Leaves* crowded at the extremity of the branches, two feet long, pinnated with numerous leaflets, which are oblong-lanceolate, acute, very entire, very smooth; 2—3 inches in length. *Panicles* axillary, very long. *Flowers* male and hermaphrodite on different plants. *Calyx* small, five-parted. *Corolla* longer than the calyx, purple, tomentose without-with glandular hairs, petals erect with inflexed margins. *Stamina* five, erect, shorter than the petals, alternating with five pair of villous corpuscules which are large and distinct in the male flower, very small in the hermaphrodite. *Ovary* five-lobed, lobes monosporous; in the male very small and abortive. *Style* one, short, curved. *Stigmata* five, thick recurved. *Capsules* from three to five, nearly ovate, smooth, bursting on one side, one seeded. *Seed* naked, (without aril or caruncle) exalbuminous.

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* The Punowyr Pait of the Malays of Malacca. It is considered by Dr. Oxley to be a valuable febrifuge.

Obs.—The corpuscules interposed between the stamina are remarkable in the male flower, being roundish erect yellow bodies, with somewhat the appearance of abortive anthers; in the hermaphrodite, however, they become simple scales. The genus differs from Cnestis in the number of the stamina, the single style, and the smoothness of the capsule; and from Connarus in the number of the ovaries and stigmas, and the want of the umbilical caruncula.

CONNARUS. *Linn.*

This genus with Cnestis has been removed by Mr. R. Brown from the Terebintaceæ of Jussieu, and formed into a separate and very natural family under the name of Connaraceæ. They are rather a numerous tribe in the Malay islands, and besides the following species of Connarus and Cnestis, I have to add the new genus Eurycoma, which appears to be sufficiently distinct from both the former. I am doubtful whether the species which I have refered to Cnestis really belong to that genus, as they have all smooth capsules with arilled or carunculate seeds, or whether they ought not to be separated from those whose capsules are clothed with prurient hair. Some confusion appears also to have existed between the species of Cnestis and Connarus, the ripe capsules of the former being often solitary from the abortion of the remaining ovaries, and I am much inclined to think that Connarus *santaloides* and *mimosoides* of Vahl in particular are in reality species of Cnestis, a supposition which is supported by the analogy of the inflorescence, which is almost without exception terminal in Connarus and axillary in Cnestis. This distinction is of some importance between genera so nearly related.

CONNARUS FERRUGINEUS. *(W. J.)*

Ferrugineo-tomentosa, foliis pinnatis, foliolis oblongis coriaceis subtus ferrugineo-villosis, paniculis terminalibus.

Bunga Buratta. *Malay.*

Native of Pulo Pinang. *Malacca.*

A small sized tree. *Branches* round, covered with ferruginous wool. *Leaves* alternate, pinnate, leaflets nine, subopposite, oblong-lanceolate, acuminate, very entire, margins reflexed, coriaceous, green and tomentose above, ferruginously villous beneath. *Petioles* round, villous, thickened at the base. *Stipules* none. *Panicles* large, terminal, sometimes with a few axillary racemes. *Flowers* numerous, white. *Bracts* roundish often curved, ferruginously villous as well as the calyces and the whole panicle. *Calyx* five-parted, laciniæ erect, oblong, acute. *Corolla* white, sprinkled with red dots, five petaled, longer than the calyx, petals erect, lanceolate. *Stamina* ten, erect, united at the base, the alternate ones much shorter. *Anthers* ovate. *Style* shorter than the long stamina. *Stigma* capitate, three furrowed. *Capsules* follicular, ferruginous, rather inflated, oblique, gibbous behind, opening on one side, one-celled, one-seeded. *Seed* bean-shaped, appendiculate at the umbilicus. *Umbilical* appendage or caruncle large, and glandular. *Embryo* dicotyledonous, conform to the seed, without albumen; radicle at a distance from the umbilicus.

Obs.—This fine species is well distinguished by its thick leathery leaves, and the ferruginous pubescence of their lower surface and of the branches and panicles.

CONNARUS VILLOSUS. *(W. J.)*

Villosissimus, foliolis 5—7 lanceolatis longe acuminatis supra glabris, paniculis terminalibus dense stellato-villosis ferrugineis.

Native of Sumatra.

The whole plant densely and ferruginously woolly. *Branches* round. *Leaves* alternate, pinnate, leaflets 5 or 7, subopposite, oblong lanceolate, narrowing towards the base, terminating in a long acumen, entire, smooth above, villous beneath with stellate pubescence; about six inches long. In young leaves the upper surface is covered with deciduous pubescence. *Panicles* large, terminal, and from the upper axils, densely villous, ferruginous. *Bracts* long, linear, thick curved, villous. *Calyx* five-parted, villous. *Corolla* five-petaled, limb spreading. *Stamina* ten, united into a ring at the base, the alternate ones shorter. *Ovary* densely pilose with plumose hairs. *Style* longer than the stamina. *Stigma* capitate.

Obs.—This plant is covered with denser and rougher wool than the preceding, particularly on the panicles, and the leaves are much longer, acuminate, and not coriaceous.

CONNARUS SEMIDECANDER. *(W. J.)*

Foliis pinnatis, foliolis 3—5 lato-lanceolatis subtus villosiusculis, paniculis terminalibus axillaribusque villosis, filamentis alternis sterilibus.

Mangul, also Akar Sidinka. *Malay.*

Abundant in thickets at various places on the West Coast of Sumatra.

It is a small tree, with wrinkled bark; the young shoots and leaves are softly and ferruginously villous. *Leaves* alternate, pinnate; leaflets from 3 to 5, ovate-lanceolate, acuminate, entire, smooth above, slightly villous beneath, nerves lucid; 3—4 inches long. *Panicles* terminal or from the upper axils, villous and brownish. *Flowers* numerous.

Bracts small. *Calyx* five-leaved, erect, reddish, tomentose. *Corolla* of a light bluish colour, five-petaled; petals longer than the calyx, spreading at the limb. *Stamina*, filaments five fertile, exsert; five alternate ones short, sterile; all united into a ring at the base. *Style* somewhat shorter than the stamina. *Capsule* tomentose, ferruginous, follicular, two valved, one-seeded. *Seed* with an umbilical caruncle.

Obs.—This is one of the most common species in Sumatra, and like all the rest of the genus frequents thickets and copses, or what is called by the Malays *Belukar*, rather than the great forests.

CONNARUS GRANDIS. (*W. J.*)

Foliis pinnatis, foliolis quinis ovato-lanceolatis glabris, paniculis terminalibus, capsulis magnis glabris.

At Tappanuly in Sumatra.

A moderate sized tree. *Leaves* alternate, pinnate, leaflets generally five, ovate-lanceolate, acuminate, entire, smooth; 8 or 9 inches long. *Panicles* terminal, long, smooth. *Capsules* large, oblique, red, smooth, follicular, bursting on one side, one-seeded. *Seed* with a large umbilical caruncle.

Obs.—I have not seen the flowers.—It has larger leaves and fruit than any other species that I have met with, and is further distinguished by the smoothness of all its parts.

CONNARUS LUCIDUS. (*W. J.*)

Foliis pinnatis, foliolis glaberrimis nitidis emarginato-acuminatis, paniculis terminalibus ferrugineis, calyce persistente.

Sumatra.

A small tree, with long divaricate subscandent branches. *Bark* brown and wrinkled. *Leaves* alternate; leaflets 5—9, ovate-lanceolate or elliptic oblong, terminating in a long linear acumen which is emarginate at the point, entire, very smooth, shining and lucid; 2—2½ inches long. *Panicles* terminal, small and delicate, ferruginously tomentose. *Flowers* pale red. *Calyx* five-leaved, tomentose. *Corolla* five-petaled, petals narrow. *Stamina* ten, monadelphous at the base, the alternate ones short. *Style* one, longer than the stamina. *Capsule* obovate, less oblique than usual in the genus, embraced at the base by the enlarged persistent calyx, smooth, bursting on one side, one-seeded. *Seed* attached nearly at the base, the umbilicus half embraced by the cup-shaped caruncula, which is rather smaller than usual.

Obs.—This is a small delicate species, having smooth shining leaves with emarginate points; the panicles are small, and seldom bring more than one or two fruit to perfection.

XXI. ANACARDIEÆ.

MANGIFERA QUADRIFIDA. MSS. *Jack.**

Leaves lanceolate with attenuate base. *Panicles* loose, axillary. *Flowers* quadrifid monandrous. *Petals* glandular at the middle.

Malay. Assam Kumbong.

Sumatra and other islands of the eastern Archipelago.

A loftier tree than the common Mango, with a straighter trunk, and more compact foliage. *Leaves* alternate, long-petioled, lanceolate, acute, attenuated to the base, very entire, smooth, coriaceous and flat. *Petiole* roundish, somewhat thickened at the base. *Stipules* none. *Panicles* lax, open and spreading, axillary, crowded at the summits of the branches. From two to four panicles generally come out just below the thick termination of the branch, each supported by a leaf. Sometimes there are other panicles below these from the axils of the lower leaves. *Flowers* small and white. *Bracts* small, deciduous. *Calyx* four-leaved, somewhat reflex. *Corolla* white, four-petalled, spreading, after flowering conniving, petals ovate-lanceolate, acute, furnished in the middle with an irregular, yellow, glandular crest. *Nectary* of four round, fleshy lobes united into a cup-like receptacle, on which the germen is situated. *Stamina* inserted on the lobes of the nectarium, not within them as in the M. *Indica;* one fertile, as long as the corolla; sterile filaments very short. *Germen* oblique. *Style* declinate, as long as the stamen. *Fruit* roundish, becoming very dark-coloured, containing an ovate seed.

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* Roxb. Fl. Ind. ed. Carey. 2. 440.

There are generally some male flowers in the panicle, and rarely a flower occurs with a small superfluous fifth petal placed within the rest.—W. Jack.

MANGIFERA FŒTIDA. *Loureir.**

Leaves firm, broad-lanceolate. *Panicles* terminal, ascending, lengthened, smooth. *Flowers* sub-monandrous. *Corols* infundibuliform; *limb* spreading, at length reflexed.—MSS. Jack.

Manga fœtida, *Rumph. Amb.* i. 98. *t.* 28.

Malay. Bachong.

A native of Penang, Sumatra, &c. *Malacca.*

A larger tree than the common mango. *Leaves* very firm and rigid. *Panicles* large and red-coloured. *Stamina* inserted on the lobes of the nectarium, one, sometimes two, fertile. *Fruit* very fœtid, eaten by the Malays.—W. Jack.

MANGIFERA CÆSIA. *Jack.*†

Leaves rigid, broad-lanceolate, attenuate at the base. *Panicles* terminal, erect, tomentose, glaucous. *Flowers* monandrous. *Petals* erect. *Fruit* oblong.—MSS. Jack.

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* Roxb. Fl. Ind. ed. Carey. loc. cit.

† Roxb. Fl. Ind. ed. Carey, 2. 441.

Malays Binjaee.

Sumatra. *Malacca.*

A large tree. *Branches* rough with the vestiges of the fallen leaves. *Leaves* fifteen or sixteen inches long, alternate, petiolate, broad-lanceolate, acuminate, tapering to the base and decurrent on the petiole, very entire, smooth, thick and rigid, strongly nerved, the middle rib flattened. *Petioles* short. *Panicles* large, erect, terminal, finely tomentose, of a glaucous reddish-colour. *Bracts* small. *Calyx* erect, slightly tomentose. *Corolla* erect, purple within, paler without. *Nectary* small, slightly lobed. *Stamina* on the nectary, one fertile. *Style* oblique. *Fruit* oblong-obovate, of a reddish white colour.—W. Jack.

STAGMARIA. *W. J.**

Pentandria Trigynia.

Calyx inferus, tubulosus, deciduus, ore irregulariter ruptus. *Corolla* pentapetala, petalis stipiti germinis insertis. *Stamina* quinque, petalis alterna, filamentis longitudine fere corollæ; antheris oblongis. *Ovarium* trilobum, lobis monosporis, 1—2 sæpe abortivis. *Styli* 1—3 ex apicibus loborum ovarii, staminibus breviores. *Stigmata* obtusa. *Bacca* reniformis, hinc sulcata, cortice varicoso, monosperma. *Semen* exalbuminosum; embryone erecto, pseudo-monocotyledoneo, fissura laterali; radicula incurva.

Arbor succo resinoso caustico scatens, foliis simplicibus exstipularibus, floribus paniculatis.

This genus is nearly related to *Rhus*, but distinguished by the following particulars. The petals and stamina are both inserted on the stipes of the ovary, which is not surrounded by a nectarial ring, as in *Rhus*, and is three-lobed when perfect. The styles are inserted on the lobes of the ovary, and do not spring from one point. Their number depends on the number of perfect lobes of the germen, and it is most common to find only one. The calyx is tubular, deciduous, and bursts irregularly. The structure of the fruit is also different, the seed not being here contained in a nut, and having the embryo erect, not inverse, as in *Rhus.*

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* Companion to the Botanical Magazine, 1. 267.

On all these accounts, added to the difference of habit, particularly in having simple leaves, I have little hesitation in considering it as a distinct genus.

STAGMARIA VERNICIFLUA. *(W. J.)*

Arbor vernicis. *Rumph. Amb. II. p.* 259, *t.* 86.

Kayo Rangas. *Malay.*

Native of the Eastern Islands; it does not appear to be abundant in Sumatra, but occurs occasionally in the neighbourhood of rivers, as at Nattal and Moco-Moco. *Malacca.*

This tree grows to a considerable size; the branches and branchlets are smooth, round, and marked with small dots. *Leaves* alternate or scattered, petiolate, elliptico-lanceolate, about eight inches long, subattenuate to the base, rather acute, sometimes obtuse, or even retuse at the point, very entire, very smooth, firm, and shining, with lucid nerves. *Petioles* about an inch long, flattened above. *Stipules* none. *Panicles* axillary, on rather long peduncles. *Flowers* numerous, pedicellate, white, having rather a narcotic smell. *Calyx* tubular, deciduous, bursting into two or three irregular segments. *Corolla* much longer than the calyx, spreading, somewhat reflex, five-petaled; *petals* oblong, rather obtuse, adnate at the base to the column which supports the ovary. *Stamina* five, inserted on the same column above the petals, alternating with them, and nearly of the same length; *filaments* thread-shaped; *anthers* short, oblong, two-celled. *Ovary* on a pedicel or column, sometimes three-lobed, but more frequently there is only one distinct lobe, whose position on the pedicel is rendered oblique by the abortion of the other two; each lobe contains a single ovulum attached to the inner angle. *Style* crowning the lobes of the ovary, from one to three, according to the number of perfect ovaries or lobes, shorter than the stamina. *Stigmata* obtuse. *Berry* as large as a fresh walnut, reniform or somewhat spheroidal, but rather irregular in shape, generally furrowed on one side; the rind is rough and brownish, of a spongy texture, often exhibiting on the surface the appearance of various veins, and when cut, exudes an acrid juice; it contains a single seed, similar in form to the fruit, and equally abounding with a corrosive gum or resin. *Embryo* exalbuminous, erect. *Cotyledons* united, having a fissure on one side; *radicle* at the base of the fruit, short, incurved upon the cotyledons at the lower part of the fissure.

Obs.—The wood of this tree is of a fine dark colour towards the centre, and lighter coloured near the circumference. The bark exudes a resin which is extremely acrid, and, applied to the skin, causes excoriation and blisters. The people consider it dangerous to handle any part of the tree, and even to sit or sleep under its shade. This resin, on exposure to the air, soon assumes a black colour, and becomes hard; it is collected and employed as a varnish, and sells for this purpose at a high price. According to Rumphius, it is the tree which yields the so-much celebrated Japan lacquer or varnish, and he considers it the same with that of Siam and Tonquin. Loureiro, however, who had better opportunities of observing the latter, represents the varnish of those countries as the produce of a different tree, which he has described under the name of *Augia.* The varnish of Siam and Cochin China is probably the best; but that of Celebes and Java, which is the produce of this tree, is also employed for the same purposes, and cannot be much inferior, since it bears as high a price, and according to Rumphius, higher. The process of obtaining and using it is thus given by Rumphius:—"The exhalations of this tree are considered noxious, and the people of Macassar and other parts of Celebes in particular, entertain such dread of it, that they dare not remain long under it, much less repose beneath its shade; they say that whoever receives the droppings from it, will have his body swell, and be affected with malignant sores. As, however, it furnishes the so-celebrated varnish, other people boldly repair to this tree, particularly the Chinese and Tonkinese, who employ great precautions in collecting the resin, which is accomplished in the following manner. A number of Chinese proceed, about evening, to the place where the trees grow, which is always at a distance from the resort of men or animals, each selects a few, and inserts into the trunks two pieces of bamboo, sharpened at their points, in such a manner as to penetrate the bark in a somewhat oblique direction. These remain all night, and are extracted before sun-rise the next morning, the trees yielding no juice during the day. The resin is found in greater or less quantity according to the richness or poorness of the soil, and is obtained only at certain seasons of the year, particularly about the time of flowering. The people who collect it unite the produce of their labour, and afterwards make an equal division of the whole on which account this resin maintains a high price, a single pikul (containing a hundred catties) selling, in those provinces of China which do not possess this tree, for two or three hundred dollars; in Tonkin and Camboja, however, it may be had for thirty, fifty, or sixty dollars. It is a custom among the Chinese, when they approach this tree, first to rub its trunk lightly, before inserting the bamboos, wishing by this to show that they are not afraid, for they say that timid persons will sooner feel its noxious effects than those who are bold and fearless.

"The resin is prepared for varnish in the following way:— To one pound of resin add an equal weight of the oil of Tang-yhu, which is a Chinese tree related to the Boonga Tanjong [*Mimusops Elengi*], from whose fruit a red transparent oil is prepared, resembling our Linseed Oil: others put one pound of oil to three of the resin, which are gently heated together, and make a very black varnish. If, however, to one pound of resin, two pounds of oil be added, a varnish of a brownish yellow, and sometimes of a straw-colour, is produced, with which wood is lightly done over, to bring out the grain and veins. Moreover, if while the varnish is heated, red lead, powdered galls, or other dry pigments be added, it gives the same colour to the work upon which it is employed. This liquid varnish ought to be covered with water to prevent its becoming hard. The articles to which the varnish is applied must always be placed in a cool and moist place to dry, which they do slowly; but when once hardened, the varnish never becomes soft again, except by the suffusion of hot water, which often dissolves it.

"The Chinese carry this prepared resin in large pots from Siam and Camboja to Japan, where it is disposed of to great profit.

"The Japanese are the most skilful in preparing and ornamenting all kinds of wooden articles with this varnish, of which they annually use large quantities, their black lacquered works are dispersed, on account of their elegance, to all parts of the world."

Loureiro says, that the black lacquer is produced by the varnish in its natural state, unmixed with any foreign ingredient, and that it is only for producing red and other colours that pigments are added. He gives his *Augia* as a native of China, Cochin China, Camboja, and Siam; Rumphius' tree is a native of Java, Celebes, Bali, and other parts of the Archipelago.

Under the article Sanga, in the Encyclopedie Methodique, a part of Rumphius' account of this tree is given, but by a singular mistake of the reference to the plate, it is conjectured to be a species of *Hernandia*, an error which the slightest attention to the terms of the description ought to have prevented. In the first volume of the same work, the *Arbor vernicis* is made a species of *Terminalia*, under the specific appellation of *T. Vernix*, and the supposition has not been rejected by later authors. It is needless to add, that it has not the least relation to *Terminalia*.

XXII. SAPINDACEÆ.

MILLINGTONIA.* *Roxb.*

Calyx 5—phyllus, foliolis duobus exterioribus minoribus. *Corolla* 5—petala, petalis duobus minoribus squamiformibus. *Stamina* quinque, quorum tria sterilia difformia basi petalorum majorum inserta; duo fertilia basi minorum adnata, filamentis apice scyphum gerentibus cui antherae bilobae insident. *Ovarium* nectario annulari cinctum, biloculare, loculis disporis. *Drupa* nuce plerumque monospora. *Embryo* erectus, curvatus, albumine nullo aut parco.

Obs.—It will be perceived that I have made a considerable and material alteration in the terms of the generic description from that given by Roxburgh, *Fl: Ind: I. p.* 102, which I conceive to be necessary towards explaining the true relations of the various parts of the flower, and thereby

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[*] The explanation of Mr. Jack and of Dr. Arnott does not appear to me to apply to Millingtonia simplicifolia, in which, from observations made in Upper Assam in 1837, there would appear to be a composition of two of the three acknowledged petals. This, though it may appear to increase the complexity of the flower, will be found perhaps to simplify it essentially. It seems to me, moreover, not improbable that in this genus, as it now stands, there are two modifications of structure of the flower, which may hereafter lead to the formation of another genus.—W. G.

affording the means of tracing more correctly its natural affinities. The principal point is to determine the real nature of what Roxburgh calls the nectarial scales at the base of his petals; I have no hesitation in considering them as abortive stamina, which the examination of the flower before expansion places, I think, beyond a doubt. In that state the whole of the stamina connive over the pistil, the anther of the fertile ones is turned inwards, so as not to be visible, and there is no considerable difference of appearance between them and the sterile ones. The anther-bearing hollow of the fertile stamina is applied to a corresponding hollow on the side of the sterile ones, and at the time of expansion the former separate themselves with a jerk and become erect, while the latter continue in their original position incumbent over the pistil. The petals on which the fertile stamina are inserted are much smaller and narrower than the others, as if exhausted by the greater development of the parts they nourish. These petals are called by Roxburgh outer laminæ of the filaments, which is contrary to all common analogy, while the other explanation might be supported by numerous examples of a similar structure. Thus in place of a diandrous flower with tripetalous appendiculate corolla and bifid stamina, we obtain five as the primary number of all the parts, only modified by the partial abortion of three of the stamina.

MILLINGTONIA SUMATRANA. (*W. J.*)

Foliis impari-pinnatis, foliolis 3—6 jugis ovato lanceolatis, petalis minoribus acutis, fructu ovato.

Found on the island of Pulo Nias.

It is a moderate sized tree with grey bark. *Leaves* alternate, pinnate with an odd one which is rarely wanting; leaflets from 5 to 13, opposite, ovate lanceolate, acuminate, entire, smooth, 6—9 inches long. *Common petiole* flat above and marginate, thickened at the base. *Panicles* terminal, many-flowered, rather coarctate, with stiff rigid divisions, slightly tomentose. *Flowers* white. *Bracts* minute. *Calyx* small, five-leaved, the outer two smaller, resembling bracts. *Corolla* five-petaled, the outer three large, subrotund, the inner two much smaller, lanceolate, acute. *Stamina* five, inserted on the bases of the petals; two fertile, upon the smaller petals, with broad filaments expanding at top into a kind of cup, on which the anther rests, and to whose outer edge it is attached: the anther consists of two yellow lobes resembling masses of pollen which burst transversely. The three sterile stamina which are inserted on the larger petals have thick filaments without anthers, but marked with an oblong cup-like cavity on each side corresponding to the cups of the fertile ones. Before expansion, the five stamina connive over the pistil in such a manner that the cup-like cavities are mutually applied to each other; on expansion the fertile stamina separate with a jerk, by which the pollen is in part dispersed, and the cup becomes erect with the anther resting upon it; the other three never separate but remain conniving over the pistil. *Ovary* embraced at the base by a nectarial cup with five toothlets; ovate, two-celled, each cell containing two ovula attached to the centre of the partition. *Style* short. *Stigma* small. *Berry* ovate, oblique or recurved, somewhat less than an olive, containing a single one-seeded nut. *Nut* obovate-oblong, acute and curved at the base, carinate along one side, and having a large umbilical hollow above the base on the other, smooth, one seeded. *Seed* obovate-oblong, acute at the base, covered with a dry loose brown skin; *albumen* none; *embryo* glutinous on the surface, erect, doubled on itself; *Cotyledons* thin, foliaceous, large, round ovate, reflected backwards upon the radicle, and half embracing it laterally; *Radicle* inferior, very large, thick, pointed, extending the whole length of the seed, and partly doubled up or curved at the top.

Obs.—The cotyledons are wrapped round the embryo in such a manner, as to give the whole somewhat of a chrysaloid appearance. This species has considerable resemblance to the M. pinnata of Roxburgh, but differs in having unequally pinnate leaves, with from 3 to 6 pair of leaflets, in having the smaller petals entire and acute, not tridentate, in the nectarial ring having five simple toothlets, not three bidentate angles, and in having a large ovate fruit with a smooth, not rugose nut. The abortive cell is generally observable near the umbilical foramen.

NEPHELIUM LAPPACEUM.

Marsd. Hist. Sumatra. Pl. IV.

Rambutan. *Malay.*

Frequent throughout the Malay Countries and Islands.

A tree. Leaves alternate, pinnate, leaflets generally from 5 to 7, ovate, acute at both ends, very entire, smooth. Panicles terminal, erect. Flowers numerous, small, white, male and hermaphrodite. Calyx from 4 to 6 parted, spreading. Corolla none. Stamina from 5 to 8, spreading, longer than the calyx, inserted into a disk below the germen. Anthers subrotund. Ovarium two-seeded, abortive in the male flowers. Style one. Stigmata 2, revolute. Fruit geminate, one commonly abortive, the rudiment of which remains at the base of the perfect one, which is subrotund, covered with a coriaceous rind and echinate with long soft spines, one-seeded, the seed covered with a white acid pulp.

The fruit is much esteemed, and has an agreeable subacid flavour. The parts of the flower vary much in number; six is perhaps the most frequent number of the stamina. There is but one style, not two as commonly described. The affinities of this tree seem to have been little understood. It belongs without doubt to the family of the Sapindi, and is closely related to Scytalia, as justly conjectured by the author of the botanical articles in Rees' Cyclopedia.

SAPINDUS RUBIGINOSUS. *Roxb.*

Octandria Monogynia.

Arborescens inermis, paniculis terminalibus, calycibus 5 phyllis, corollis 4-petalis, baccis tribus connatis oblongis.

Kalit layu. *Malay.*

Pulo Pinang.

Arborescent. Leaves alternate, abruptly pinnate, leaflets nearly opposite, subsessile, ovate-lanceolate, obtuse with a small mucro or point, very entire, nearly smooth, with a few scattered hairs chiefly on the under surface. Petioles tomentose. Panicles terminal erect, composed of numerous simple racemes. Pedicels short, generally in pairs. Bracts subulate. Calyx 5-leaved, leaflets subrotund, concave, the two outer ones smaller. Corolla white, 4-petalled, somewhat longer than the calyx, petals ovate, obtuse, appendiculate at the base, appendices furnished with two transverse lines of white hairs. Stamina 8, of which the five upper and longer are incumbent over the remaining three; filaments villous; anthers oblong, yellow. Style 1, short, persistent. Stigma capitate, 4-sided villous. Germina three one-seeded. Berries three, connate at the base, purple, oblong, one-seeded.

HEDYCARPUS.*

Tetrandria Monogynia.

Perianthium 4-partitum, inferum. *Stamina* 4. *Ovarium* 3-loculare, loculis disporis. *Stigmata* tria. *Capsula* baccata, 3-valvis, 3-locularis, seminibus arillo sapido tunicatis. Embryo inversus, albumine inclusus. *Arbor foliis alternis simplicibus, floribus racemosis.*

NOTE.—This and the following genus are referred in Endlicher's Genera Plantarum to Euphorbiaceæ, whether correctly or not, I cannot at present take upon myself to say.—W. G.

* Lin: Trans: Vol. xiv. p. 118 t. 119.

The stamens are occasionally five in number, with a five-parted perianth and four-celled ovary.

HEDYCARPUS MALAYANUS.

Bera Tampui. *Malay.*

Sumatra.

A small tree. *Branchlets* smooth. *Leaves* alternate, petiolate, broad-ovate, rounded at the base, acuminate, nearly entire, with recurved edges, sometimes obsoletely crenulate, very smooth, deep green and shining above, and paler beneath, strongly nerved; from nine to ten inches long. *Petioles* thickened at both ends, from two to two inches and a half long. *Stipules* ovate, acute, deciduous. *Racemes* principally from the trunk and larger branches, but sometimes axillary, fascicled or solitary, straight, from two to three inches long; pedicles supporting several flowers, tomentose. *Bracts* on the pedicel below its subdivision, small, broad. *Perianth* small, yellowish, villous, somewhat fleshy, four, sometimes five-parted; segments narrow. *Stamens* four, sometimes five, alternate with the segments of the perienth, short; anthers roundish, two-lobed. *Ovary* small, three, sometimes four-celled; each cell containing two ovula attached to the inner angle. *Style* scarce any. *Stigmas* three, sometimes four, fleshy, villous. *Fruit* about the size of a China orange, with a thick rough rind, three-valved, three-celled; cells generally two-seeded, partitions opposite to the valves. *Seeds* enveloped in a white juicy aril, as in the *Lansium*, &c. *Embryo* contained in an ample albumen, inverse. *Cotyledons* flat, foliaceous, cordate, subrotund. *Radicle* superior, short, clavate.

Obs.—This is a fruit which ranks in point of taste and flavour along with the Lanséh, &c., but it is by no means so frequently met with. The genus is most nearly allied to *Pierardia* of Roxburgh, with which it agrees in general habit, in foliage, in the mode of inflorescence, and in the structure of the seeds, but differs in having a valvular fruit and in the number of the stamens. The following description of the Choopa, another highly esteemed Malayan fruit, which belongs to *Pierardia*, will illustrate the affinity between these two genera.

PIERARDIA. *Roxb.**

Perianthium 4-partitum. *Stamina* octo, brevia. *Ovarium* 3-loculare, loculis disporis. *Stigma* trifidum. *Bacca* corticata, trilocularis, loculis 1—2-spermis. *Semina* arillo sapido tunicata. *Embryo* inversus, albumine inclusus.

Arbores, floribus racemosis, foliis alternis simplicibus.

PIERARDIA DULCIS.

Monoica, foliis obovatis.

Bua Choopa. *Malay.*

Sumatra.

This is a middle-sized tree. *Leaves* crowded at the ends of the branches, alternate, petiolate, obovate, or elliptic-obovate, rounded at the top, with a short blunt acumen, entire, smooth, flat; from eight to nine inches long. *Petioles* thickened and jointed above and below. *Stipules* ovate, deciduous. *Racemes* from the naked branches. Male and female flowers in distinct racemes; in the former the pedicels are generally three-flowered; in the latter one-flowered. *Bracts* small.

MALE.—*Perianth* four-parted, spreading, yellowish, tomentose within, very slightly so without. *Stamens* eight; *filaments* very short; *anthers* two-lobed. *Ovary* abortive.

FEMALE.—*Perianth* considerably larger than in the male, divided to the base into four long thick lobes; sometimes there is a fifth. *Stamens* none. *Ovary* subglobose, three-celled; cells two-sporous. *Style* none? *Stigmas* three, spreading, fleshy, hispid. *Berry* subglobose, larger than a cherry, of a yellowish colour, three-celled; cells generally one-seeded. *Seeds* enveloped in a white pulpy aril or tunic. The embryo is inverse, with flat cotyledons in the centre of an ample albumen.

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* Lin: Trans: Vol. xiv. p. 119 t. 121.

Obs.—This species differs from that described by Roxburgh in being monoecious, in the form of the leaves, and in the colour of fleshy aril. The Rambeh, of which Mr. Marsden has given a figure in his *History of Sumatra, pl.* vi. *p.* 101, so nearly resembles this, that I think it can only be a variety of the same. The Rambeh belongs to the peninsula of Malacca, and is unknown at Bencoolen; while the Choopa, which is abundant at the latter place, is not found in the former. The racemes of the Rambeh are longer and the fruit smaller than in the Choopa; but a comparison and examination of the two would be necessary to ascertain whether there are any essential differences, and I have not had an opportunity of doing this.

XXIII. MELIACEÆ.

LANSIUM.[*] *Jack non Blume.*

Decandria Monogynia. N. O. Meliaceæ. Juss.

Calyx 5-partitus. *Corolla* 5-petala, petalis s[illegible]rotundis. *Tubus staminiferus* globosus, ore subintegro, antheris decem inclusis. *Ovarium* 5-loculare, loculis 1—2-sporis. *Stylus* brevis, columnaris. *Stigma* planum, 5-radiatum. *Bacca* corticata, 5-locularis, 5-sperma, uno alterove loculo tantum semen perficiente. *Semina* integumento extoriore pulposo sapido. *Albumen* nullum; cotyledonibus inœqualibus peltatis.

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[*] Lin: Trans: Vol. xiv. p. 115 t. 118.

Arbores, foliis pinnatis, floribus racemosis.

LANSIUM DOMESTICUM

Langsat or Lanséh. *Malay.**
Lansium. *Rumph. Amb.* i. *p.* 151. *t.* 54.
Marsden's *Hist. of Sumatra, pl.* v. *p.* 101.
Native of the Malay Islands.

A moderate-sized tree. *Branchlets* tomentose. *Leaves* alternate, pinnate; leaflets from seven to nine, alternate, short, pedicelled, elliptic-oblong, broader above, rounded towards the point, and terminating in an obtuse acumen, entire, very smooth; nerves pubescent beneath; from seven to ten inches long. The young leaves are pubescent on the under surface. *Stipules* none. *Racemes* springing from the trunk and naked branches, sometimes solitary, sometimes fascicled, at first suberect, but drooping afterwards by the weight of the fruit; tomentose: flowers sessile, alternate, solitary, tribracteate at the base. *Calyx* deeply five-parted; segments round, concave, imbricated. *Corolla,* five-petalled, yellowish, a little longer than the calyx; petals subrotund. *Staminiferous tube* sub-globose: mouth nearly entire; anthers ten, inserted within the tube. *Ovary* five-celled; cells containing a single or double ovulum attached above to the inner angle. I have never observed two distinct ovula; but the single one is often marked with a furrow, as if composed of two united together. *Style* short, thick, columnar, ten-furrowed. *Stigma* flat, obscurely radiated. *Berry* of a yellowish colour, cortical, seated on the persistent calyx, oblong-ovate, or oval, slightly tomentose, five-celled five-seeded. *Seeds* enveloped in a white semi-transparent pulpy tunic or aril, exalbuminous; cotyledons solid conform to the seed, unequal, irregularly transverse, peltate; the short pilose radicle being inserted into their centre. Two seeds are frequently contained in one common integument, so firmly united as to appear but one, until by dissection the two radicles and four irregular cotyledons are discovered. There are seldom more than one or two cells in each fruit that perfect their seed; the others are only filled with the white transparent pulp.

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* *I am not yet certain whether there is a specific difference between the Lanseh of Malacca and to Dookoo of the same place.—W. J.*

Var. β. *L. aqueum.*

Foliolis subtus villosis, racemis densis, sæpius solitariis, fructibus globosis.

Ayer Ayer. *Malay.*

The Ayer Ayer so nearly resembles the Lanséh in most particulars, that I hesitate to rank it as a distinct species, and content myself with mentioning it as a permanent and well-marked variety. They are principally distinguished by the Malays by their fruit, that of Ayer Ayer being rounder, and the pulp more watery (whence the name), and dissolving more completely in the mouth than that of the Lanséh. Both are highly esteemed by the Malays, and are equally agreeable to the European palate. The juicy envelope of the seeds is the part eaten, and the taste is cooling and pleasant.

This genus has hitherto been known only from Rumphius' figure and description, and its place in the system has therefore continued uncertain. From an examination of the fruit, M. Corea de Serra conjectured it to be intermediate between the families of *Aurantiæ* and *Guttiferæ*, but the structure of the flower determines its true place to be among the *Meliaceæ*.

I have further met in the forests near Bencoolen with a tree which appears to agree very nearly with the *Lansium montanum, Rumph. Amb.* i. *p.* 154. *t.* 56. It differs in the number of the stamens, styles and seeds from the *Lansium* described above, but agrees with it exactly in carpological structure and in general habit. Its characters coincide very nearly with those of Roxburgh's *Milnea*. They are as follow:

Flowers small and inconspicuous. *Calyx* five-parted. *Corolla* five-petaled. *Stamineous tube* subglobose, entire at the mouth; anthers five, within the tube. *Style* two. *Stigmas* two, simple. *Berries* globose, about the size of the domestic Lanséh, 1—2 celled, 1—2 seeded. *Seeds* enveloped in a thin subtransparent pulpy tunic or envelope, which has somewhat the flower of the Lanséh, but with a bitterish and rather disagreeable smell. Carpology as in the *L. domesticum.*

The leaves are pinnate with about seven leaflets, elliptic-oblong, broader above and narrowing to the base, terminating in a long obtuse acumen, entire, very smooth. *Petioles* sprinkled as well as the branchlets with ferruginous pulverulent tomentum. *Stipules* none. *Panicles* axilliary or supra-axillary, shorter than the leaves, composed of a few short branches with small greenish flowers.

Milnea is perhaps scarcely distinct from *Lansium;* but if admitted as a separate genus, the above will constitute a second species differing from *M. edulis,* Roxb. in being digynous, and may be denominated *M. montana.*

MELIA EXCELSA. *(W. J.)*

Decandria Monogynia.

Foliis pinnatis, foliolis integerrimis, paniculis coarctatis axillaribus foliis paullo longioribus.

Pulo Pinang.

A lofty tree, with straight trunk and light grey bark. Branches rough with the vestiges of the fallen leaves, foliose at their summits. Leaves crowded, disposed in a spiral manner, pinnate with an odd one which is often wanting, leaflets subopposite, oblong-lanceolate, inequilateral, obtusely acuminate, very entire, smooth, shining above. Petioles round, smooth, thickened, and somewhat scaly at the base. Panicles axillary, ascending, rather longer than the leaves, not diffuse. Flowers pedicellate, pedicels bracteolate. Calyx very small, 5-parted. Corolla white, five-petalled, spreading, petals linear. Staminiferous tube erect, gibbous at the base, ten dentate, ten furrowed, as if consisting of ten united filaments. Anthers ten, oblong, yellow within the mouth of the tube. Style as long as tube. Stigma capitate.

XXIV. AURANTIACEÆ.

MURRAYA PANICULATA.

Decandria Monogynia.

N. O. Aurantiæ.

Foliolis ovatis acuminatis, floribus terminalibus axillaribusque subsolitariis, baccis oblongis saepius dispermis.

Chalcas paniculata, *Lour: Fl: Coch: p.* 270.

Camunium. *Rumph: Amb: V. p.* 26. *t.* 17.

Kamuning, *Malay.*

This is an abundantly distinct species from *M. exotica,* though unaccountably confounded with it by latter authors. Loureiro discriminates between them very well, and his description is on the whole good. Rumphius's figure is bad, but preserves several of the distinguishing characters, particularly in the inflorescence and leaves, which however are not sufficiently acuminate. It grows to the size of a small tree, and the wood is much employed for the handles of kreeses, being capable of receiving a fine polish. The leaflets are generally five, ovate, terminating in a long acumen which is slightly emarginate at the point, shining and very entire, the terminal one considerably the largest. In *M. exotica,* the leaflets are more numerous and closer, obovate, blunt, and of a much firmer, thicker substance. The flowers of *M. paniculata* are fewer and larger than those of *M. exotica,* and are sometimes terminal, generally one or two together, from the axils of the upper leaves. The ovarium is two celled; the berries are oblong, reddish, and mostly contain two seeds which are covered with silky hairs. The berries of *M. exotica* are ovate, and generally one-seeded. The whole habit of the two plants is very distinct. The specific name *paniculata* is objectionable, as the flowers are much less panicled than in the other species.

The Camunium sinense, *Rumph, V. t.* 18 *f.* 1. which is commonly met with in gardens in all the Malay Islands is quite a distinct genus from the other two Camuniums, and has been described by Loureiro, *Fl: Cochinch*: *I. p.* 173, under the name of

AGLAIA ODORATA.

It has a five parted inferior calyx, and five petalled corolla. The stamina are five in number, and are inserted in the manner of the Meliaceæ on the inside of an ovate nectarial tube, which is contracted at the mouth, and conceals the anthers. The stigma is large, sessile, simple as far as I have observed, not double, as stated by Loureiro. The ovary appears to be one celled, and to contain two pendulous ovula. It rarely ripens its fruit in these Islands, but according to Loureiro, it bears a small red one-seeded berry. The flowers are very small, yellow and fragrant, in small axillary panicles.

In the Catalogue of the *Hortus Bengalensis, p.* 18, this plant is specified under the name of Camunium *Sinense*, after Rumphius. The Murraya *paniculata* above described is the true Kamuning of the Malays, and the name C. Sinense is only applied by Rumphius in the manner of the old botanical authors, as one of comparison and resemblance, for want of a better of native origin; if therefore the generic name Camunium is to be adopted at all, it ought to be applied to the plant to which it really belongs, and cannot be admitted for one of a different family not indigenous to the Malay Islands. On this account Loureiro's name is to be preferred.

CHIONOTRIA. *(W. J.)*[*]

Decandria Monogynia.

Calyx 5-partitus, inferus. *Corolla* 5-petala. *Stamina* 10, erecta. *Ovarium* 2 loculare, 2 sporum, ovulis pendulis, *Stylus* 1. *Stigma* capitatum. *Bacca* monosperma. *Semen* exalbuminosum apice umbilicatum; cotyledonibus maximis convexo-planis, radiculâ superâ minimâ.

Frutex, foliis simplicibus oppositis pellucido-punctatis, racemis axillaribus.

Genus Aurantiis affine.

CHIONOTRIA RIGIDA.

Native of Pulo Pinang.

A shrub with corrugated grey bark. *Leaves* opposite, very short-petioled, ovate-lanceolate, acuminate, narrow at the base, very entire, very smooth, pellucidly punctate. *Stipules* subulate, acute. *Racemes* axillary, erect, rigid, branched, strict, shorter than the leaves, pedicels short, rigid, many-flowered. *Flowers* greenish, inconspicuous. *Bracts* very small. *Calyx* very small, 5-parted. *Corolla* a little longer than the calyx, 5-petalled. *Stamina* ten, exsert, erect; anthers incumbent. *Ovarium* superior, two-celled, two-seeded, seeds pendulous. *Style* thick, as long as the stamina. *Stigma* capitate, obtuse. *Berry* of the size of a cherry, snow white, globular and somewhat flattened, umbilicate, consisting of a spongy farinaceous pulp, and containing a single large round seed. *Seed* globose, attached superiorly and there umbilicate. *Integument* coriaceous, marked with veins which diverge from the umbilicus. *Albumen* none. *Embryo* inverse, conform to the seed. *Cotyledons* plano-convex, of a deep green colour, somewhat rugose externally, and punctate on the inner surface. *Radicle* superior, obverse to the umbilicus, short, straight, cylindrical, obtuse, covered with ferruginous down. It is elongated into a short conical plumule.

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[*] Sclerostylis. Blume?—W. G.

XXV. AMPELIDEÆ.

VITIS RACEMIFERA. *(W. J.)*

Tetrandra, foliis quinatis, foliolis spinescenti-serratis subtus incanis, cirrhis oppositifolis racemiferis, racemis compositis longissimis, baccis dispermis.

Akar Charikun, or Bayur Akar. *Malay.*

Native of Sumatra.

A large strong woody climber. *Branches* round, villous. *Leaves* alternate, quinate, leaflets pedicellate, oblong obovate, acute, subspinoso-serrate, the serratures being formed by the spinescent termination of the nerves, smooth above, hoary beneath, frequently with a ferruginous shade. *Petioles* villous. *Cirrhi* opposed to the leaves, very long, simple or bifid, when bifid one branch becomes the peduncle. *Racemes* very long, compound, consisting of numerous densely flowered racemuli inserted on a peduncle formed of the thickened tendril. The whole raceme is often a foot and a half in length. *Peduncles* ferruginously villous. *Flowers* sessile on the partial peduncles, small, green. *Calyx* minute, embracing the base of the corolla, quadridentate. *Corolla* deeply four-parted. *Stamina* four, anthers yellow. *Ovary* surrounded by a fleshy ring, tetrasporous. *Style* scarce any. *Stigma* thick. *Berry* of the shape of an olive and nearly as large, purple, juicy, two-seeded.

Obs. This would be a species of Cissus according to the Linnean division, but that genus has now been united to Vitis by Mr. Brown, as they differ in nothing but the number of parts.

XXVI. PITTOSPOREÆ.

PITTOSPORUM ?*

Calyx beneath, five-leaved, erect. *Corolla* five-petalled: *petals* alternating with the calyx. *Nectary* five-lobed, surrounding the ovary. *Stamina* five, inserted on the nectarial lobes. *Ovary* one-celled, six-seeded. *Capsule* three-valved, one-celled, with three parietal placentas. Some of the seeds abortive. *A pentandrous, monogynous shrub, with alternate leaves and axillary inflorescence.*

PITTOSPORUM ? SERRULATUM. (*W. J.*)

A shrub with smooth branches. *Leaves* alternate, very short petioled, lanceolate, acuminate, slightly serrated, very smooth. *Stipules* lanceolate, acute, very deciduous. *Peduncles* short, axillary, solitary; from six to eight-flowered. They are frequently from the axils of the fallen leaves. *Flowers* yellowish green, fascicled, short-pedicelled. *Bractes* small, acute. *Calyx* inferior, ovate, five-leaved, leaflets ovate, acute, conniving at their apices. *Corolla* yellowish, five-parted, petals inserted on the receptacle, ovate-lanceolate, acute, a little longer than the calyx, and alternating with its leaflets. *Nectary* short, five-lobed, surrounding the germ. *Stamina* five, inserted into the lobes of the nectary, erect, included; *anthers* sagittate, acute, conniving into a ring round the style. *Ovarium*, superior, ovate, one-celled, six-seeded. *Style* a little longer than the stamina, tomentose together with the ovary. *Stigma* simple. *Capsule* surrounded at the base by the persistent calyx and the withered corolla and nectary, triangularly globose, three-valved, one-celled; *seeds* attached along the middle of each valve to parietal prominent placentæ, six in number, several aborting, roundish and angular.—W. Jack's MSS.

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* I have taken the liberty of thus disposing of Mr. Jack's Pittosporea serrulata, which afforded the materials for Celastrus pauciflorus. Wall. (vide Roxbg. Fl. Ind. ed. Carey. 2. p. 400,) " a native of Penang where it is called Boonga Lawung."

XXVII. CELASTRINEÆ.

CELASTRUS ? BIVALVIS. (*W. J.*)*

Pentandria Monogynia.

Foliis lanceolatis acuminatis integerrimis, pedunculis lateralibus paucifloris, corollis nullis, capsulis bivalvibus monospermis.

A shrub with smooth branches. *Leaves* opposite, petiolate, lanceolate, acuminate, acute at the base, very entire, very smooth. *Stipules* none. *Peduncles* lateral, divaricately dichotomous, few flowered, (5—10 flowered). *Bracts* small. *Calyx* five-parted, bibracteate at the base, laciniæ roundish, imbricated. *Corolla* none. *Stamina* five, erect, united beneath into a five-toothed ring or urceolus; filaments flat; anthers oblong. *Style* erect, as long as the stamina. *Stigma* truncate. *Capsule* ovate, green, smooth, crowned with the style, two-valved, one-celled, one-seeded; valves opening from the base, and falling off from the seed, which is more persistent and remains on the peduncle. *Seed* ovate, contained in a beautiful crimson arillus which is delicately veined. *Albumen* cartilaginous, conform to the seed. *Embryo* erect, central, as long as the albumen. *Cotyledons* flat, foliaceous, ovate, obtuse. *Radicle* inferior, obverse to the umbilicus, round, much shorter than the cotyledons.

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* Penang.—W. Jack.

XXVIII. HIPPOCRATEACEÆ.

SALACIA. *Linn.*

This genus seems to require a little elucidation. It was originally referred to Gynandria, the fleshy nectary on which the stamina are inserted having been mistaken for the germen, and the real ovary, on account of its smallness, having escaped the observation of Linnæus and Loureiro. This is now I believe generally admitted; there can therefore be no doubt of the identity of Roxburgh's Johnia with Salacia, and his *I. Salacioides* agrees so well with *S. Chinensis*, particularly in having entire leaves, that it is questionable whether they are not the same, for it is to be observed that in most of the species the leaves are only subopposite, and may occasionally on the same tree be found both opposite and alternate. Tonsella *prinoides. Willd: Act: Am: Nat: Berol: IV.* is also without doubt a true species of Salacia, if it be not in fact the same plant as the Johnia *Coromandeliana, Roxb: Flor: Ind: I. p. 173.* Calypso *salacioides* of Aubert du Petit Thouars agrees exactly with these in the structure of the flower, but differs in having many-seeded berries. Some of the species of Tonsella appear likewise to have polyspermous fruit, but those which have definite seeds are probably true species of Salacia. It may be questioned whether the distinction founded on the number of seeds be really of generic value where the agreement is so exact in all other respects, especially if it should be found that a gradation exists from the one to the other in the fruit of the different species. This, however, can only be determined by an accurate examination of the ovaries and fruit of the various plants at present ranged under Tonsella.

In the natural arrangement Salacia undoubtedly bears the greatest affinity to Hippocratea, it being scarcely possible to distinguish the two genera when only in flower. It also agrees in many particulars with the Celastrinae, but differs in having exalbuminous seeds. The union of the Hippocraticeæ and Celastrinæ has, however, been suggested by Mr. Brown in his remarks on the Botany of Terra Australis. Under the above view the genus will be characterized as follows:

Calyx inferus 5-fidus. *Corolla* 5-petala. *Stamina* 3, disco carnoso inserta. *Ovarium* 3-loculare, loculis 1—2 sporis, ovulis axi affixis. *Bacca* 1—3 sperma.

Frutices vel arbusculae, foliis suboppositis simplicibus.

I have met with two species in Sumatra, one with anthers sessile on the nectary, which agrees very nearly both with *S. chinensis* and Roxburgh's *I. salacioides:* the other with anthers supported on filaments, and nearly related to *I. Coromandeliana, Roxb.*

XXIX. OCHNACEÆ.

GOMPHIA SUMATRANA. *(W. J.)*

Decandria Monogynia.

O. N. Ochnaceæ.

Foliis lanceolatis vel oblongo-ovalibus acuminatis obtuse denticulatis nitidis subquinque nerviis, stipulis intrapetiolaribus deciduis, paniculis terminalibus.

Sibooru. *Malay.*

Sumatra.

A large shrub or small tree. *Leaves* alternate, short petioled, eight or nine inches in length, from lanceolate to oblong oval, varying considerably in breadth from two to three inches, acuminate, acute at the base, obtusely denticulate, very smooth, shining, middle nerve very strong, lateral veins numerous, transverse, somewhat reticulate, delicate, uniting near each margin into two nerves which run parallel to it almost the whole length, and give the leaf the appearance of being five-nerved. *Petioles* very short. *Stipules* intrapetiolar, broad at the base, acuminate, deciduous. *Panicles* terminal, not much branched; pedicels slender, rarely solitary, surrounded at their base by small acute bracts. *Calyx* five-leaved, persistent, leaflets ovate, acute, smooth, lucid. *Corolla* yellow, five-petalled, scarcely longer than the calyx. *Stamina* ten; filaments very short; anthers long, linear, opening at the top by two pores. *Style* as long as the stamina. *Stigma* acute. *Ovaries* five, surrounding the base of the style, and elevated on a receptacle. This receptacle enlarges as the fruit ripens. The number of abortive ovaries is variable; sometimes only one comes to perfection. The berries are drupaceous, obliquely reniform, somewhat compressed, one-seeded. Seed exalbuminous.

Obs.—This appears to have so much resemblance to the G. Malabarica, *Decand:* Pua Tsjetti. *Rheed. Mal. V. p.* 103. *t.* 52, that I have some hesitation in proposing it as a distinct species. The points of difference are the following: the leaves of this are much longer than those of the Malabar species which are described as almost veinless, while in this the transverse veins unite into two very distinct marginal nerves, which it is difficult to suppose could have escaped observation had they existed in the other. The representation of the inflorescence in Rheede's figure is unintelligible, and his description of it is not much clearer, but as far as it can be made out, it appears different from this. Further examination of the Malabar plant will be necessary to determine whether this is really distinct, and whether the differences above noticed exist in the plant itself, or are mere omissions in the description

EUTHEMIS. *(W. J.)**

Pentandria Monogynia.

Calyx inferus, 5-phyllus. *Corolla* 5-petala. *Stamina* quinque, hypogyna, antheris oblongis acuminatis apice poro dehiscentibus. *Stylus* filiformis, staminibus æqualis. *Bacca* 5-sperma; seminibus circa axim dispositis, oblongis, intus angulatis, arillo fibroso inclusis, albuminosis, embryone inverso cylindrico longitudine fere seminis, radicula superiore.

Frutices, foliis alternis pulcherrime striatis nervis parallelis, racemis terminalibus, demum peractâ floratione lateralibus et oppositifoliis.

EUTHEMIS LEUCOCARPA. *(W. J.)*

Foliis lanceolatis pulchre spinuloso-serratis, racemis basi ramosis, baccis niveis globosis.

Plawan bruk. *Malay.*

Native of the forests of Singapore.

A shrub of uncommon elegance and beauty, erect, four or five feet in height; branchlets round, smooth, sometimes slightly angled. *Leaves* alternate, petiolate, lanceolate, acute, decurrent on the petiole, spinuloso-serrate, very smooth and shining, beautifully striated with fine parallel transverse nerves. *Petioles* margined, flat and channeled above, dilated at base into a thick rounded prominent rim, which half embraces the stem. *Stipules* lanceolate acuminate, ciliate, very deciduous. *Racemes* erect, with one or two branches near the base, at first terminal, afterwards lateral and oppositifolious by the shooting up of the stem from the base of the peduncle. *Flowers* pedicellate, generally in pairs. *Bracts* ovate, acute. *Calyx* inferior, five leaved, spreading, leaflets ovate, obtuse, ciliate, the two inner ones rather smaller. *Corolla* white, sometimes tinged with purple, 5-petaled, petals twice as long as the calyx, reflexed, ovate-oblong, obtuse. *Stamina* five, inserted below the ovarium: alternating with these are sometimes found five short abortive filaments. *Filaments* very short. *Anthers* longer, erect, conniving round the style, oblong, prolonged into acumina which are sometimes a little contorted, and which open at their summits by a pore, the cells are adnate below to the sides of the filament. *Ovary* oblong, acute. *Style* filiform, erect, equal to the stamina. *Stigma* simple. *Berry* snow white, globular, obscurely angled, crowned with the persistent style which is obliquely deflexed; of a spongy or farinose substance, containing in the centre five seeds which are disposed round the axis, and enclosed in arilli composed of tough longitudinal fibres. *Seeds* (pyrenae ?) oblong, somewhat reniform, hard. *Albumen* conform to the seed. *Embryo* inverse, cylindrical, nearly as long as the seed. *Cotyledons* semicylindric, obtuse. *Radicle* superior, longer than the cotyledons.

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* Referred with doubt to Ochnaceæ by Dr. Lindley and M. Endlicher. I have no knowledge of the genus.—W. G.

The branches are terminated by long corniculate buds in which the gemmation is involute.

EUTHEMIS MINOR. (*W. J.*)

Foliis angusto-lanceolatis leviter serrulatis, racemis simplicibus, baccis rubris angulatis acuminatis.

Found at Singapore along with the preceding.

This is a smaller shrub than the former, branched, and smooth. *Leaves* alternate, petiolate, linear-lanceolate, rather obtuse with a mucro, attenuated to the petiole, slightly serrulate, very smooth, shining, finely striated with transverse veins. *Petioles* short, thickened at the base, channeled above. *Stipules* linear, ciliate. *Racemes* simple, erect, at first terminal, becoming afterwards lateral. *Flowers* alternate, pedicellate, often in pairs. There is a single leaflike bract and several smaller ones at the base of the pedicels, less deciduous than in the preceding. *Calyx* five leaved, leaflets ovate, ciliate. *Corolla* white, spreading, five-petalled, petals lanceolate, acute. *Stamina*, five, erect, conniving, hypogynous; filaments very short; anthers yellow, oblong, broader at the base, two-celled, cells adnate to the sides of the filament, prolonged above into an acumen opening at the top by a pore. *Ovary* oblong, acute. *Style* a little longer than the stamina. *Stigma* simple. *Berry* red, five-angled, acuminate, composed of a whitish farinaceous pulp, and containing five seeds, each enveloped in a tough fibrous arillus, and in structure the same as the preceding.

XXX. TERNSTRŒMIACEÆ.

TERNSTRŒMIA.

The Malayan species of Ternstrœmia exhibit a remarkable agreement among themselves, at the same time that they differ considerably from the rest of the genus. They have a trilocular ovarium surmounted by three styles which are inserted on the same point, but are separate to the base. In some, the corolla is monopetalous with monadelphous stamina, in others it is five petaled with distinct stamina. The anthers are two-celled and open at the top by two oblique pores; this is probably the case with the whole genus, though it has been omitted in the generic character, of which it ought certainly to form an essential part. It seems doubtful whether the monogynous species with bilocular fruit and definite seeds ought to be united with those which have three styles, three cells and numerous seed, but an examination of their ovaries and placentation is necessary to decide the question. I have met with four species in Sumatra and the adjacent islands, two of which I have already described in the first volume of the Malayan Miscellanies. Their common appellation in Malay is Ingor-ingor Karbau, or Buffaloe's spittle.

TERNSTRŒMIA RUBIGINOSA. *(W. J.)*

Polyandria Monogynia.

Foliis ovatis spinuloso-serratis subtus incanis, floribus lateralibus et axillaribus fasciculatis monadelphis, pedunculis calycibusque glauduloso-pilosis, fructu triloculari.

Seengo eengo. *Malay.*

Sumatra.

A tree. *Branches* cinereous, young parts covered with acute scales. *Leaves* alternate, petiolate, ovate acuminate, spinuloso-serrate, smooth above, hoary and white beneath, the nerves furnished with ferruginous paleaceous scales. *Flowers* in fascicles, lateral and axillary. *Peduncles* and calyces covered with glandular hairs. *Bracts* small about the middle of the peduncles. *Calyx* five-parted. *Corolla* white, campanulate rotate, five-parted, divided about half way down. *Stamina* numerous; filaments short, united at the base into a ring which is inserted on the bottom of the corolla; anthers oblong, recurved, affixed by the middle, two-celled, opening at the top by two oblique pores. *Ovary* ovate, acute, covered with glandular hairs, three-celled, polyspermous, placentæ central. *Style* trifid, divided to the base. *Stigmata* simple.

TERNSTRŒMIA PENTAPETALA. *(W. J.)*

Foliis obovato-lanceolatis, spinuloso-denticulatis glabris, floribus lateralibus fasciculatis, pedunculis glabris, fructu triloculari.

Native of Pulo Pinang.

A shrub with grey bark and leafy at the summit. *Leaves* alternate, petiolate, 10 to 12 inches long, obovato-lanceolate, acuminate, spinuloso-denticulate, smooth; the nerves are furnished with a few appressed, innocuous, scale-like spines. *Petioles* about an inch in length, covered as well as the summits of the branches and buds with small ferruginous scales. *Flowers* in fascicles below the leaves, from the axils of the fallen ones of the preceding year; they are pedicellate and white. *Calyx* colored, five leaved, the two outer leaflets smaller. *Corolla* white, five petaled, petals subrotund, a little longer than the calyx. *Stamina* numerous, distinct, inserted on the base of the petals; filaments short; anthers oblong, yellowish white, didymous, truncate at the top and there opening by two pores. *Ovarium* ovate, three-celled, many-seeded, placentæ from the inner angles of the cells. *Style* deeply trifid. (Styles 3 ?) *Stigmata* three.

I have not seen the ripe fruit of this, but have been informed that it produces a white berry.

TERNSTRŒMIA ACUMINATA. *(W. J.)**

Foliis obovato-lanceolatis acuminatis spinuloso-denticulatis glabris, floribus axillaribus solitariis polyandris, pedunculis squamosis, fructu triloculari.

Found at Tappanully on the West Coast of Sumatra.

Branches round, somewhat flexuose. All the young parts green with a few appressed scales. *Leaves* alternate, petiolate, obovate lanceolate, attenuated to the base, terminating in a long acumen or point, spinuloso-denticulate, smooth with the exception of a few appressed scales on the lower surface; about a foot in length. *Petioles* short, scaly. *Peduncles* axillary, solitary, one-flowered, scarcely so long as the petioles, covered with small scales. *Calyx* five-leaved, the three outer leaflets with appressed scalets. *Corolla* white, five-petalled, little longer than the calyx. *Stamina* many, inserted on the base of the petals, anthers large, truncate and opening by two pores at the top. *Ovary* three-celled, many-seeded. *Styles* three.

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* Saurauj\u00e6 sp. Arnott, in Hooker's Journal of Botany, I. 375.—W. G.

Obs.—This agrees with the T. pentapetala in having the corolla divided to the base, but the leaves are more acuminate, and the flowers are solitary and axillary.

TERNSTRŒMIA SERRATA. *(W. J.)*

Folliis obovato-oblongis cartilagineo-serratis glabris, pedunculis axilaribus binis, floribus monadelphis, laciniis corollæ emarginatis, fructu triloculari.

Frequent on the island of Pulo Nias.

A small tree. Young parts furnished with brownish scales. *Leaves* alternate, petiolate, obovate-oblong, acuminate, serrate with irregular cartilaginous uncinate serratures, smooth, pretty strongly nerved; 7—8 inches long. *Petioles* brown, scaly. *Peduncles* generally two, axillary, one-flowered, slender, about an inch long. *Calyx* five-parted, whitish, leaflets unequal. *Corolla* white, monopetalous, quinquefid, longer than the calyx, cup-shaped, lobes bifid or emarginate, generally oblique. *Stamina* shorter than the corolla, and inserted on its base; filaments united below; anthers oblong, bifid, two-celled, each cell opening at top by an oblique cucullate pore. *Ovary* hairy, three-celled, many-seeded; placentæ central. *Styles* three, longer than the corolla, irregularly bent. *Berry* three-celled, many seeded. *Seeds* angled, foveolate.

Obs.—This differs from the other Sumatran species in having firmer leaves, with stronger nerves and thickened callous serratures. The peduncles are more slender, the styles longer, and the lobes of the corolla obliquely notched.

TERNSTRŒMIA CUSPIDATA. *(W. J.)*

Foliis obovato-ellipticis acuminatis dentato-serratis serraturis apice hamatis, fructibus 5-locularibus, pedunculis axillaribus 1—3 floris.

A tree, young parts ferruginous. *Leaves* petiolate, elliptic ovate, attenuated to the base, broader above, sharply acuminate, serrated, the narrow sharp toothlets generally curved or hooked at their points, smooth, often marked with whitish glandular dots on the nerves, veins, and serratures; 6—8 inches long. *Peduncles* axillary, 1—3 flowered, smooth. *Calyx* 5-parted, segments orbicular. *Corolla* white, monopetalous, 5-parted. *Stamina* numerous; anthers opening by two gaping pores. *Ovary* subglobose, 5-celled, ovula very numerous; placentæ from the inner angle of the cells. *Style* very deeply 5-parted.

Obs.—This species (received from Salumah during the printing of the present sheet) comes very near to the T. serrata; it differs in having the leaves more sharply acuminate, with longer tooth-like serratures, and rather shorter petioles; the peduncles frequently bearing two or three flowers, and not so slender as in the former; and in the 5-celled fruit.

ADINANDRA. *(W. J.)*

Polyandria Monogynia.

Calyx 5-partitus, persistens, basi bibracteatus. *Corolla* pentapetala, petalis basi latis. *Stamina* 30, pluriseriata, subpolyadelpha, interioribus brevioribus; antheris bilocularibus apice mucronatis. *Styles* unicus, subulatus. *Bacca* supera, stylo persistente acuminata, 5-locularis, polysperma, placentis ab angulo interiore loculos bipartientibus.

Arborescens, foliis alternis exstipularibus, floribus axillaribus.

ADINANDRA DUMOSA.

Daun Saribu. *Malay.*

Abundant in thickets throughout Sumatra and various parts of the Malay islands. *Common about Malacca. W. G.*

It grows to be a small tree; the bark is dark brown, and the branches are smooth. *Leaves* alternate, short petioled, elliptic oblong, acute at both ends, sometimes rounded with an obtuse acumen at top, entire or obsoletely serrate, smooth, slightly glaucous beneath, almost veinless; 3—4 inches long. *Stipules* none. *Peduncles* axillary, subsolitary, one flowered, shorter than the leaves, recurved. *Calyx* bibracteate at the base, five-parted, segments thick, subrotund, overlapping each other. *Corolla* white, twice as long as the calyx, erect or conniving, five-petalled, petals ovate oblong, broad at the base, acute. *Stamina* about thirty closely arranged in several circles, the inner ones shorter; filaments divisible to their bases, but closely pressed against each other, sericeously pilose, particularly on their outer side; anthers of the two parallel lobes adnate to the side of the filament, which is prolonged into a mucro at the summit. *Ovary* superior, smooth, five-celled, polysporous; the cells are almost biparted by placentæ which project from the inner angle, and to whose edges the ovula are attached. *Styles* single, subulate. *Stigma* simple. *Berry* globose, embraced at the base by the calyx, and acuminated by the persistent style, five-celled, many-seeded.

Obs.—In general habit and in the texture of the leaves, this plant has some resemblance to Diospyros, but differs widely in fructification.

ADINANDRA SYLVESTRIS.

Adinandra Sylvestris (W. J.) baccis trilocularibus.
Suka ber anak. *Malay.*
A large forest tree found at Moco Moco.

XXXI. HYPERICINEÆ.

ELODEA[*] *(Adanson.)*

Hypericinæ. Juss.

This genus, which has been revived by a late author on American Botany, appears to be abundantly distinguished from Hypericum, and to form a good natural division. It is principally characterised by having the stamina united into three phalanges, which alternate with an equal number of nectaries. In the following species the placentation is peculiar: I know not whether the American plants exhibit the same structure, as it is not mentioned in any description which I have seen, but if it should prove on examination that they do, it should form part of the generic character. Loureiro's Hypericum Cochinchinense which undoubtedly belongs to Elodea, appears to be very nearly related to my E. Sumatrana, and his description of the seeds seems to indicate a structure similar to what I have observed. The Hypericum petiolatum of the same author seems also referrible to this genus and to be different from Linnæus's H. petiolatum, which is a native of Brazil. In all the species now referred to Elodea, the generic distinction appears to receive confirmation from certain differences of habit, which may be remarked between them and the true Hyperica, particularly in the colour of the flowers, which in the latter is almost without exception yellow, but in Elodea is often red.

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[*] Tridesmos, Hooker and Arnott, vide Hooker's Journal of Botany, 1. p. 372.—W. G.

ELODEA SUMATRANA. (*W. J.*)

Foliis subsessilibus oblongis attenuato-acuminatis glabris rigidiusculis, paniculis terminalibus foliosis, staminibus numerosis triadelphis, petalis basi nudis.

Found at Tello Dalam in the island of Pulo Nica.

A large shrub or small tree. Branchlets rather compressed, obscurely four-sided. *Leaves* opposite, almost sessile, oblong, tapering to the point, acute, broad at the base, entire, smooth; nerves proceeding from a middle rib, strong; six or seven inches in length; the surface appears by the aid of the microscope to be dotted with opaque points. *Panicles* terminal, foliose, the lower divisions being axillary; oppositely branched and rigid. *Flowers* dark-red or purple. *Bracts* minute. *Calyx* five-leaved, persistent, leaflets ovate, smooth, the outer ones smaller. *Corolla* cup-shaped, longer than the calyx, five-petaled; petals subrotund, ungues naked, without pore or scale. *Nectaries* three, yellow, inserted below the corolla, and half as large as the petals, subrotund, doubled backwards upon themselves in such a manner as to form a sac which opens behind near the base. *Stamina* numerous; their filaments united for about half their length into three phalanges, which are inserted alternately with the three nectaries; they are a little shorter than the corolla; anthers yellow, two-celled. *Ovary* oblong, three-celled, many-seeded. *Styles* three, diverging. *Stigmata* three, subrotund. *Capsule* oblong, three-celled, each cell containing several seeds as long as the cell and attached to the bottom of the central column; they are thin and flat, disposed regularly one within the other forming concentric circles, which are particularly apparent in the transverse section of the capsule.

Obs.—This curious arrangement of the seeds is not a little remarkable: they lie one within the other like skins of an onion, each occupying the full length and breadth of the cell, but diminishing regularly in size from the outermost to the middle in proportion to the different radius of the circle which it describes round the common centre. They are attached one above the other to the bottom of the cell at its inner angle. The leaves are destitute of pellucid dots, and have their lateral nerves strongly and distinctly marked. The nectaries which alternate with the stamina are very peculiar, being saccate, apparently by being doubled backwards. This species differs from the following and those of America in having no scales at the base of the petals, and from the latter in having numerous stamina. It appears to be nearly related to Loureiro's Hypericum Cochinchinense, which as already observed, belongs to this genus.

ELODEA FORMOSA. *(W. J.)*

Foliis petiolatis lanceolatis subtus glaucis, pedunculis fasciculatis axillaribus, staminibus numerosis triadelphis, nectariis acutis.

Kayo Gaghak. *Lampong*. Sepadas Bunga. *Malay*.

Native of Sumatra.

A small tree with cinereous bark and smooth branchlets. *Leaves* opposite, elliptic oblong, acute, very entire, smooth, glaucous beneath, pellucidly punctate; two and a half inches long; the nerves proceed from a midrib. *Petioles* slender. *Peduncles* axillary and from the axils of fallen leaves, fasciculate, one-flowered, slender, smooth. *Flowers* white with a slight rosy tinge. *Bracts* several at the base of the peduncles. *Calyx* five-leaved, smooth, leaflets acute. *Corolla* five-petaled, longer than the calyx; petals oblong, each furnished with a broad adnate scale a little above the base. *Stamina* numerous, united into three phalanges. *Nec-*

taries three, alternating with the stamineous fascicles, red, acute, carinate behind, fleshy. *Ovary* three-celled, each cell containing several flat ovula lying one within the other, and attached by their bases to the lower part of the axis. *Styles* three, long. *Stigmas* capitate. *Capsules* oblong, crowned by the persistent styles, three-celled, many-seeded. *Seeds* thin, flat attached by their bases to a central triangular column, on which they are inserted alternately in a double series.

Obs.—The arrangement of the ovula is similar to that observed in the E. Sumatrana; they are thin, attached by their bases to the lower part of the cell, suberect, and concentrically disposed, but are inserted rather higher on the axis of the cell than in the former. This species agrees with those of America in having a scale at the base of the petals, but differs in having numerous stamina; it therefore comes nearer to the E. Egyptica *(Hypericum Egypticum Linn.)*

IXONANTHES. *(W. J.)*[*]

Calyx 5 passim 6-partitus, foliolis subrotundis. *Corolla* 5 v. 6-petala, glutinosa. *Stamina* 10 vel 20. *Nectarium* germen cingens. *Stylus* 1. *Capsula* supera, calyce corollâque persistentibus cincta, ovato-acuminata, 5-locularis, 5-valvis, valvularum marginibus introflexis. *Semina* singulo loculo dua, margini interiori dissepimentorum affixa, compressa, in alam membranaceam producta. *Albumen* semini conforme, embryone inverso foliaceo, plano.

Arbores, foliis alternis simplicibus, floribus dichotome corymbosis axillaribus.

IXONANTHES RETICULATA.

Floribus decandris, foliis integerrimis.

Found at Tapanully on the West Coast of Sumatra.

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[*] Appears to be allied to Archytæa, Martius Nov. gen. et sp. 1. 116. t. 37.—W. G.

A tree, with smooth compressed branchlets. *Leaves* alternate, petiolate, elliptic-oblong, emarginate, somewhat attenuated to the base, entire, smooth, firm and rigid with thick revolute edges, shining above, rather glaucous beneath, veins reticulate; about three inches long. *Petioles* short, flattened above. *Stipules* minute, deciduous. *Peduncles* axillary on the younger shoots, much longer than the leaves, smooth, dichotomous at the summit, with a pedicel in the bifurcation, bearing generally about seven flowers, which are small and green. *Calyx* five-parted, segments rounded. *Corolla* glutinous as well as the calyx, five petalled, petals roundish. *Stamina* ten; filaments inserted below the petals; anthers yellow, two-celled. *Ovary* surrounded at the base by a yellow fleshy nectarial ring, five-celled, ten-seeded. *Style* erect. *Stigma* capitate. *Capsule* surrounded at the base by the persistent calyx and corolla somewhat enlarged, oblong, pointed, smooth, five-valved, five-celled, septa formed by the introflexed margins of the valves, cells two-seeded, but frequently only one comes to perfection, they are separated from each other by a ridge which projects from the middle of the valves. *Seeds* compressed, oblong, angular, winged at the lower end. *Albumen* conform to the seed. *Embryo* inverse, central. *Cotyledons* flat, oval. *Radicle* superior, cylindrical, not so long as the cotyledons.

IXONANTHES ICOSANDRA.

Floribus icosandris, foliis crenatis.

Found in the interior of Bencoolen.

A tree. *Leaves* alternate or scattered, short-petioled, lanceolate oblong, emarginate, dentato-crenate, very smooth, shining above; about six inches long. *Stipules* small, deciduous. *Peduncles* axillary, nearly as long as the leaves, bearing a trichotomous umbel or corymb of greenish flowers. *Bracts* small. *Calyx* 5—6 parted. *Corolla* 5—6 petalled, glutinous as well as the calyx, petals spreading subrotund, pale and somewhat transparent. *Stamina* twenty, much longer than the corolla. *Nectarial* ring crenate on the margin by the compression of the filaments which are inserted round it. *Ovary* 5—6 celled, each cell containing two ovula. *Style* a little longer than the stamina. *Stigma* capitate. *Capsule* ovate, pointed, smooth, 5—6 celled, 5—6 valved, margins of the valves introflexed. *Seeds* two in each cell, attached by their middle to the inner edge of the valvular partitions, oblong, membranaceous at both ends, bifid at the lower.

XXXII. DIPTEROCARPEÆ.

DRYOBALANOPS. *Gærtn.*

Monadelphia Polyandria.

Calyx monophyllus, quinquepartitus, laciniis lineari-lanceolatis, patentibus. *Corolla* pentapetala, petalis basi junctis ovato-lanceolatis, calyce longioribus. *Stamina* plurima, monadelpha, hypogyna, longitudine fere calycis, conniventia; filamenta in annulum brevum coalita; antheræ supra tubum filamentorum subsessiles, longæ, lineares, acutæ, mucrone membranaceo, biloculares. *Ovarium* ovatum, stylo acuminatum, superum, triloculare, loculis disporis. *Stylus* filiformis, staminibus longior. *Stigma* capitatum. *Capsula* calyci grandefacto insidens et cincta laciniis ejusdem in alas spatulatas foliaceas erecto-patentes mutatis, unilocularis, trivalvis, monosperma. *Semen* embryone exalbuminoso, inverso, cotyledonibus inequalibus, chrysaloideo-contortuplicatis.

DRYOBALANOPS CAMPHORA. *Coleb.*

Kapur Barus. *Malay.*

Specimens in flower were sent by Mr. Prince, from Tapanooly, to Sir T. S. Raffles, in 1819, from which the above generic description is taken. I have since had an opportunity of seeing these noble trees in their native forests, but not at the time of flowering, and I am informed that they do not bear above once in three or four years. Mr. Colebrooke's description in the Asiatic Researches, of the tree and fruit, is so complete, that I cannot do better than copy it.

" *Trunk* arboreous. *Bark* brownish. *Leaves*, superior alternate; inferior ones opposite; elliptic, obtusely acuminate, parallel-veined, entire, smooth; three to seven inches long: one or two broad. *Petiole* short. *Stipules* in pairs, subulate, caducous. *Perianth* one-leaved, five-parted, persistent. *Capsule* superior, ovate, woody, fibrous, finely streaked with longitudinal furrows, embraced at the base by the calycine hemispherical cup, and surrounded by its enlarged leaflets, which are converted into a large, foliaceous, spatulate, rigid, reflex wings, one-celled: three-valved. *Seed* solitary, conform to the cavity of the capsule. *Integument* simple, thin, membranaceous, thickened along one side, and thence penetrating to the axis, and continued between the interior fold of the cotyledons. *Perisperm* none. *Embryo* conform to the seed, inverse, milk-white. *Cotyledons* two, unequal, *almond*—fleshy thick, chrysaloid—contortuplicate; the *exterior* one larger, convolute, and cherishing the interior one, smooth without, wrinkled within: the *interior* one much smaller, wrinkled on both sides, uniform or round cordate (as is the exterior one, if its folds be expanded). *Plumule* simple, conical, two-leaved. *Radicle* near the summit towards the back, columnar, a little curved, and ending in a short conical lip; ascending." *As. Res.* XII. p. 539.

To this accurate and ample description, I can only add the particulars which the examination of flowering specimens has enabled me to supply. The flowers are terminal and axillary, forming a kind of panicle at the extremity of the branches. The Corolla is five-petalled, longer than the calyx, the petals, ovate lanceolate, and in some degree adnate or connected together at the base. The Stamina are numerous, and have their filaments united into a ring, in which particular it differs from the genera most nearly related to it. The anthers are nearly sessile on the tube of the filaments, conniving into a conical head round the style, and terminating in acute, membranaceous points. The ovary is three-celled, containing two ovula in each cell. The style is longer than the stamina, and crowned by a capitate stigma.

In Sumatra the Camphor-trees are confined to the country of the Battas, which extends about a degree and a half immediately to the North of the Equator. They are also found in Borneo in nearly the same parallel of latitude, and I have reason to believe that there are some in the neighbourhood of Singapore and Johore. This valuable tree is not known to exist in any other part of the world, and on this account, as well as the difficulty of obtaining its produce, this kind of Camphor bears an exorbitant price. It is all carried to China, where it sells for about twelve times as much as that of Japan.

This Camphor is found in a concrete state, occupying cavities and fissures in the heart of the tree. In order to obtain it, the tree is felled and split into lengths, to allow of the extraction of the crystallized masses. The same trees yield both the concrete substance and an oil, which is supposed to be the first stage of the formation of the Camphor. The Sumatran Camphor is little known in Europe, and it would perhaps deserve examination to ascertain how far its properties differ from those of the common kind. It appears to be less volatile, and its odour is not so diffusive. A quantity of it has been recently forwarded to Sir E. Home, for the purpose of experiment.

For the natural affinities and a more detailed account of the method of procuring the Camphor,* I may refer to the able paper already quoted. It belongs to the same natural family with *Dipterocarpus*, *Shorea*, &c.

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* The following particulars concerning the extraction of the Camphor, were communicated by Mr. Prince, Resident at *Tapanooly*, to Dr. Roxburgh, and are extracted from the 12th vol. of the Asiatic Researches above referred to:—

"This tree grows spontaneously in the forests; and is to be found in abundance from the back of *Ayer Bongey*, as far north as *Bacongan*, a distance of two hundred and fifty miles. It may be classed among the tallest and largest trees that grow on this coast; several within daily view measuring six or seven feet diameter. Before it acquires such dimensions, its age is conjectured to be very considerable; but it will produce *Camphor* at a much earlier period, when the tree does not exceed two and two feet and a half in diameter. The same tree which yields the Oil would have afforded *Camphor*, if unmolested; the former being supposed to be the first stage of the latter's forming, and is consequently found in younger trees. The natives have no certain means of ascertaining the tree which produces either the one or the other; although there are some men, styled *Toongoo Nyr Cappoor*, who pretend to that knowledge; but they cannot give any reasons for their judgment, beyond favourable dreams which superstition has rendered infallible: and it must be admitted that the success of this description of people, in discovering and procuring, is greater than the majority of those who go in search of the *Camphor*; the distinction may have arisen from the peculiar favour of fortune to some individuals over others, as in most other circumstances of life, from whence they have acquired a celebrity, otherwise they could give some rational explanation of their superior success. Both *Oil* and *Camphor* are found in the heart of the tree, occupying a vacuum which, in others is frequently filled with pitch; but it does not extend to the whole length; on the contrary, they are found in small portions, of a foot, and a foot and a half long, at certain distances. The method of extracting the Oil is merely by making a deep incision with a *biliong* or *Malay* axe, in the tree, about fourteen or eighteen feet from the ground, till near the heart, where a deeper incision is made with a small aperture; and the Oil, if any in the tree, immediately gushes out, and is received in bamboos, or any

XXXIII. DILLENIACEÆ.

ACROTREMA. *(W. J.)*

Dodecandria Trigynia.

Calyx pentaphyllus. *Corolla* pentapetala patens. *Stamina* quindecim, erecta, filamentis brevibus, antheris longis linearibus apice biporis. *Ovaria* tria, distincta, 2-spora, ovulis angulo interiori affixis. *Styli* tres. *Stigmata* simplicia. *Capsulae* uniloculares.

Herba acaulis pilosa, pedunculis racemoso-multifloris.

Genus Saxifrageis affine, numero partium inusitato distinctum.

ACROTREMA COSTATUM. *(W. J.)*

Found on hills, and among rocks at Pulo Pinang.

Root tapering, sending out a few fibres. *Stem* scarcely any. *Leaves* alternate, spreading, short-petioled, six inches long, oblong-obovate, obtuse, sagittate at the base, dentato-serrate, somewhat ciliate, pilose, furnished with a short

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other utensil better approved of; in this manner, a party proceeds through the woods wounding the Camphor-tree till they attain their object. The *Camphor* is procured in pretty nearly the same way. The trees are cut to the heart about the same height from the ground as in the former instance, till the *Camphor* is seen; hundreds may be thus mutilated before the sought-for tree is discovered; when attained, it is felled, and cut in junks of a fathom long, which are again split, and the *Camphor* is found in the heart, occupying a space in circumference of the thickness of a man's arm. The produce of a middling-sized tree is about eight *China catties*, or nearly eleven pounds, and of a large one, double that quantity. The *Camphor* thus found is called *Se Taniong*. It is often the case that the trees which have been cut, and left standing in that state, will produce *Camphor* in seven or eight years after, which is distinguished by the name of *Oogar*, but is inferior in appearance, though of the same quality. The sorts of *Camphor* called *belly* and *foot*, are the scrapings of the wood that surrounds it.

tomentum and also with more remote longer appressed hairs; the nerves are very hairy, parallel, and terminate in the denticulae of the margin. *Petioles* short, sheathing; their margins dilated into membranaceous auricles which might be considered adnate stipules. *Peduncles* or scapes central, erect, from three to six inches high, pilose, recurved at the summit, eight or ten flowered. *Flowers* yellow, pedicellate, racemose. *Calyx* five-leaved, pilose, leaflets ovate acute. *Corolla* yellow, spreading, five-petalled, petals broader above, lanceolate. *Stamina* fifteen, erect, hypogynous; filaments very short. *Anthers* very long, linear, two-celled, opening by two pores at the top. *Ovaries* three, distinct, superior, one-celled, two-seeded, each bearing one style of the height of the stamina. *Ovula* attached to the inner angles. *Stigmata* simple. *Capsules* three.

Obs.—I am at a loss to determine the exact affinities of this plant; it has the habit of the Saxifrageæ, but the number of both the male and female parts of fructification is greater by one-third, and the ovaries are distinct.

TETRACERA ARBORESCENS. *(W. J.)*

Polyandria Tetragynia.

Foliis obovatis integerrimis glabris, floribus paniculatis axillaribus et terminalibus, calycibus pentaphyllis.

Found near the shores of the Bay of Tapanooly in Sumatra.

Arborescent. *Leaves* alternate, petioled, about three inches long, oblong-obovate, rounded at the apex and terminating in a short point, very entire with reflex edges, smooth, shining above, coriaceous and firm, veins reticulate, nerves somewhat pilose on the under surface. *Petioles* short. *Panicles* axillary and terminal, many flowered. *Calyx* five-leaved, spreading, persistent, smooth. *Stamina* numerous. *Capsules* generally three, smooth and shining, roundish ovate, opening on one side containing a single seed attached to the base of the capsule, and enveloped in a pale yellowish laciniate arillus. The vestiges of two or three abortive ovula are observable in the bottom of the capsule.

WORMIA EXCELSA, *(W. J.)*

N. O. Dilleniaceæ Dec.

Foliis ellipticis acutis denticulatis, pedunculis multifloris oppositifoliis, pedicellis clavatis.

Kayu Sipur. *Malay.*

In forests near Bencoolen.

A large tree. *Leaves* alternate, petiolate from elliptic ovate to elliptic oblong, acute, denticulate or obsoletely serrate, smooth; 8—12 inches long. *Petioles* deeply channeled above. *Peduncles* oppositifolious at the summit of the branches, many-flowered; pedicels alternate, clavate. *Flowers* large, yellow, three inches in diameter. *Calyx* 5-leaved, leaflets subrotund, concave unequal. *Corolla* 5-petalled, spreading, petals ovate-oblong. *Stamina* very numerous, the outer ones yellow, spreading, shorter than the inner which are purple, erect and recurved above; anthers, lobes adnate to the filament. *Ovaries* 6—8 connate, polysporous. *Stigmas* as many, flat, recurved, diverging. *Capsules* 6—8, whitish semitransparent, bursting at the inner angle, and then spreading, containing no pulp. *Seeds* attached to the edges of the capsules, enveloped in a red aril.

Obs.—This is a large forest tree which yields excellent timber, the wood having some resemblance to oak.

WORMIA PULCHELLA. *(W. J.)*

Foliis obovatis integerrimis, pedunculis solitariis axillaribus unifloris, floribus pentagynis.

Found at Natal.

A small tree. *Branches* round, rather smooth. *Leaves* alternate, petiolate, oblong-obovate, rounded at top, with a short blunt point, sometimes retuse, very entire, very smooth, thick and rather coriaceous; about five inches long. *Petioles* smooth, channeled and marginate above, less than an inch in length. *Peduncles* axillary and subterminal, solitary, one-flowered, angled, about two inches long. *Bracts* none. *Calyx* 5-leaved, leaflets subrotund, smooth. *Corolla* five-petaled. *Stamina* numerous. *Ovaries* five, collected into a globe, terminating in as many flat reflexed diverging styles. *Stigma* thickened. *Capsules* five, of a light semitransparent rose colour, bursting at their angles, and then spreading like a corolla. *Seeds* attached to the inner edges of the capsules, a few only coming to perfection, partly embraced by a red pulpy aril which originates from the umbilicus.

Obs.—This species is very beautiful when in fruit, from the delicacy of the colours which the capsules exhibit.

XXXIV. ANONACEÆ.

UVARIA HIRSUTA. *(W. J.)*

Polyandria Polygynia.

Tota hirsuta etiam calyces fructusque pilis erectis, floribus subsolitariis, petalis patentibus subequalibus, foliis ovato-oblongis basi cordatis.

Pulo Pinang.

The whole plant is hirsute with long erect hairs. *Branches* round. *Leaves* alternate, short-petioled, ovate-oblong, acuminate, cordate at the base, entire, simply pilose above, hirsute beneath with stellate fasciculate hairs. *Flowers* lateral, almost solitary, short-peduncled. *Bracts* lanceolate acute. *Calyx* hairy as well as the peduncles and bracts, bursting irregularly, often in two segments. *Corolla* of a deep red color, six-petalled, petals spreading, lanceolate, acute. *Stamina* numerous with long linear anthers. *Germina* numerous; styles and stigmata the same. *Berries* numerous, long pedicelled, oblong, hirsute with ferruginous hairs, many-seeded. *Seeds* arranged in a double longitudinal series.

XXXV. TILIACEÆ.

MICROCOS TOMENTOSA. *Smith in Rees' Cycl.*

Polyandria Monogynia.

N. O. Tiliaceæ.

Foliis trinerviis subtus villosis.

Grewia Paniculata. *Roxb: Hort: Beng: p. 93.*

Native of Pulo Pinang.

A moderate sized tree with rough bark, the branchlets villous and ferruginous. Leaves alternate, short petioled, elliptic oblong, broader above, with a short acumen, three-nerved, dentate, serrate towards the apex, scarcely pilose above, densely villous beneath, the hairs divaricate and often stellate. Stipules linear, generally bifid. Panicles terminal. Flowers for the most part in threes, involucred with deciduous trifid and linear bracts. Calyx five-leaved, spreading, leaflets oblong concave. Corolla yellow, less than the calyx, petals ovate, unguiculate and without nectaries. Stamina numerous, inserted below the germen. Germen stipitate. Drupe containing a nut marked externally with five lines, three-celled, three-seeded.

This agrees perfectly with the excellent description given by Sir J. E. Smith in Rees' Cyclopedia from a specimen preserved in the herbarium of the younger Linneus, unaccompanied with any notice concerning its native country, and also deficient in fruit. Its affinity to the original species of Microcos is fully proved on actual examination of the fruit, and this exact agreement affords a further confirmation of the propriety of separating Microcos from Grewia. The terminal inflorescence and involucral bracteæ form a peculiar and distinctive character: in this species the flowers are generally three together, and are surrounded by three trifid bracteæ, within which are found three other smaller and linear ones.

MICROCOS GLABRA. (*W. J*).

Foliis trinerviis serratis glabris.

Found on the Island of Carnicobar.

It nearly resembles the M. Tomentosa, differing chiefly in having smooth leaves. In inflorescence and fruit it is entirely similar. The young branches are tomentose. There are frequently flowers in the uppermost axils.

XXXVI. STERCULIACEÆ.

STERCULIA COCCINEA. *Roxb.*

Monadelphia Decandria.

Foliis oblongo-lanceolatis obtuse acuminatis glabris, racemis axillaribus et lateralibus nutantibus, laciniis calycinis linearibus patentibus, folliculis coccineis.

Native of Pulo Pinang.

A large smooth shrub. Leaves at the summits of the branches, alternate, petiolate 8—10 inches long, oblong lanceolate, obtusely acuminate, abrupt at the base, entire, smooth on both sides. Petioles thickened at the ends. Racemes lateral from among the leaves at the end of the branch, drooping; flowers alternate, pedicellate; pedicels articulate. Tube of the calyx somewhat ventricose, limb five-parted, laciniæ linear with revolute margins, twice as long as the tube, spreading. Corolla none. Stamina 10, sessile on the stipes of the germen. Ovarium stipitate on a column of the length of the tube, subrotund, five-lobed, crowned with a declinate style. Stigmata five, linear, revolute. Fruit composed of five nearly equal crimson follicles, each of which contains two or three seeds, which are enveloped in a black pulpy arillus.

Dr. Roxburgh's S. coccinea is a native of Sylhet, and is said to have panicled flowers and 4-8 seeded follicles. My plant agrees however so well in every other respect that I cannot consider it to be really distinct, as those differences may be merely the effect of a less favorable situation.

STERCULIA ANGUSTIFOLIA. *Roxb.*

Foliis lanceolatis superne latioribus acuminatis subtus villosis, racemis extra axillaribus nutantibus, laciniis calycinis linearibus apice connexis.

Unting Unting Besar. *Malay.*

Native of Pulo Pinang.

A tree. Branches covered with ferruginous wool. Leaves at the summits of the branches, alternate, petiolate, lanceolate, broader above, acuminate, narrowing to the base and there rounded, entire, smooth (in adult leaves) above, covered beneath with stellate hairs. Petioles thickened at both ends, ferruginously villous as well as the nerve of the leaf. Stipules linear, acute, shorter than the petiole, deciduous. Racemes (*panicles?*) near the extremity of the branches lateral or extra axillary, branched, lax, ferruginous. Bracts linear lanceolate, acute. Calyx deeply 5-parted, tomentose, laciniæ long, linear, acute, connected at their points and gaping at the sides, greenish yellow, with a red spot at the base. Corolla none. Stamina 10, on a curved column. Ovarium stipitate, tomentose, 5-lobed. Style declinate. Stigma five-lobed.

A great proportion of the flowers are male, and I have not seen the perfect fruit.

Dr. Roxburgh's plant was a native of Chittagong.

XXXVII. ELÆOCARPEÆ.

ELÆOCARPUS NITIDUS. *(W. J.)*

Polyandria Monogynia.

Foliis ovato-lanceolatis serratis, racemis axillaribus foliis brevioribus, staminibus quindecim, nuce quinque-loculari loculis plerumque quatuor abortivis.

Bua Manik. *Malay.*

Native of Pulo Pinang.

A tree of moderate size, with grey bark and round smooth branches. *Leaves* alternate, petiolate, three or four inches long, ovate-lanceolate, acuminate, obtusely serrate, attenuated to the base, very smooth. *Stipules* none. *Racemes* simple, axillary, secund, shorter than the leaves. *Flowers* white, short-pedicelled. *Calyx* deeply five-parted, laciniæ linear, acute. *Corolla* five-petaled, fimbriated at the summit. *Nectary* of five yellow retuse glands surrounding the ovary. *Stamina* fifteen, erect; ten are inserted by pairs between the glands of the nectary, the remaining five between those glands and the ovary. *Anthers* linear, bilamellate at the summit. *Style* as long as the calyx. *Stigma* simple. *Drupe* globose, containing a five-celled nut, which is rugose, and marked with five obtuse longitudinal ridges; in general only one cell is fertile and contains a single seed. *Seed* furnished with albumen; embryo inverse, with flat cotyledons and superior radicle.

Obs.—This may perhaps be one of the smaller varieties of Ganitrus mentioned by Rumphius; it differs from *E. Ganitrus* of Roxburgh, who quotes Rumphius III. t. 10, in the number of the stamina, the position of the racemes, and the number of fertile cells in the nut. Compare Adenodus sylvestris, *Loureiro Fl: Cochinch:* p. 294. which agrees in the number of the stamina. I suspect Gaertner must have fallen into an eror in representing the embryo erect in his Ganitrus, in this it is certainly inverse.

MONOCERA. *(W. J.)*

Elæocarpi Species.

Calyx pentaphyllus. *Corolla* pentapetala, petalis apice laciniatis, saepe sericeis. *Stamina* plura, antheris apice dehiscentibus, unicornibus, valvula altera majore. *Ovarium* basi glandulis cinctum, biloculare, polysporum. *Drupa* nuce 1—2 sperma.

This genus whose characters appear to be sufficiently distinct, will include, besides the following new species, several hitherto referred to Elæocarpus, viz. *E. Monocera, Cavanilles,* the separation of which has already been suggested, and of which the specific name may be appropriately adopted for the geuus, *E. rugosus, E. aristatus,* and *E. bilocularis* of *Roxburgh,* probably also *E. grandiflorus* and *E. reticulatus,* Sir *J. E. Smith in Rees' Cyclopedia.* The E. dentatus, *Dicera dentata, Forst*: may also belong to this, if, as remarked by Sir J. E. Smith, *Rees' Cycl. in loco,* the anthers have only one of their valves awned, not both equal, as originally stated by Forster. His capsule may perhaps be only the ovary, which will then agree with the present genus.

MONOCERA PETIOLATA. *(W. J.)*

Foliis longe petiolatis ovato-lanceolatis integris glabris, racemis axillaribus foliis brevioribus, petalis medio intus incrassatis villosis.

Native of Pulo Pinang.

A lofty tree. *Leaves* petiolate, alternate or scattered, eight or nine inches long exclusive of the petiole, ovate lanceolate, generally obtusely acuminate, entire, very smooth, deep green and shining above, with lucid nerves and veins which are destitute of glands. *Petioles* four inches long, smooth, thickened at the base and summit. *Racemes* axillary, as long as the petioles; flowers pedicellate, turning one way. *Calyx* white, five-leaved, leaflets lanceolate acuminate. *Corolla* white, five-petalled, as long as the calyx, petals ovate lanceolate, fringed at the point, sericeous without, thickened along the middle and covered with white hairs within, margins inflexed. Ten thick subrotund yellow glands surround the stamina. *Stamina* numerous, (25—30) inserted within the glands, erect, shorter than the petals; filaments short; anthers longer, linear, bivalved at the apex, the outer valve elongated, the inner short and acute. *Style* filiform, longer than the stamina. *Stigma* acute. *Ovary* ovate, two-celled many-seeded. *Drupe* ovate, containing a smooth, one-celled, 1-2 seeded nut.

MONOCERA FERRUGINEA. *(W. J.)*

Foliis oblongo-ovatis acuminatis integris subtus cum pedunculis ramulisque ferrugineo-villosis, racemis axillaribus foliis brevioribus.

Found at Singapore.

A tree. *Branchlets* rusty and villous. *Leaves* irregularly alternate, petiolate, oblong-ovate, acuminate, six or seven inches long, entire with revolute edges, smooth above, ferruginously villous below, nerves without glands. *Petioles* from two to two and a half inches long, villous and ferruginous, thickened under the leaf. *Racemes* axillary, shorter than the leaves. *Flowers* pedicelled. *Peduncles* and pedicels ferruginous. *Drupe* oval, of the form of an olive but smaller, with a single rather smooth nut, which generally contains but one perfect seed; sometimes there is a second smaller, and the vestiges of the partition and abortive ovula can almost always be observed. *Seed* oblong, pointed above. Albumen conform; *Embryo* inverse, extending nearly the whole length of the albumen. *Cotyledons* flat, oblong with a distinct nerve along their middle. *Radicle* superior clavato-cylindrical, much shorter than the cotyledons.

Obs.—I have not seen the flowers of this species, but its fruit and general resemblance to the preceding leave no doubt as to the genus, and its characters are sufficiently marked to distinguish it from the others.

XXXVIII. EUPHORBIACEÆ.

ROTTLERA ALBA. *Roxb.*

Foliis rhomboideo-ovatis subtus incanis, paniculis terminalibus laxis, fructibus stellato-pilosis spinis mollibus chinatis.

Baleangin. *Malay.*

Sumatra and Pulo Pinang.

A tree of moderate size. Branches roundish, furfuraceous with appressed stellate hairs. Leaves alternate, petiolate, rhomboidal-ovate, often approaching to three-lobed, long acuminate, rounded and biglandular at the base where the petiole is inserted within the margin, remotely denticulate towards the apex, smooth and green above, hoary and tomentose beneath. The young leaves have stellate deciduous hairs on the upper surface. Petioles long. Stipules none. Panicles terminal, or from the bifurcations of the branches, peduncled, lax, and drooping. Flowers small, numerous, short pedicelled. Bracts small, and together with the peduncles and calyx sprinkled with furfuraceous tomentum.

Male. Calyx 3-phyllous, leaflets ovate acute. Stamina numerous in the centre of the flowers. Anthers subrotund.

Female. Calyx 4, sometimes 5-parted, erect, laciniæ acute. Styles three, diverging, hirsute above. Stigmata simple. Fruit tricoccous, beset with soft flexible spines, and covered with stellate hairs, three-seeded. Seeds subrotund, attached to the superior and internal angle of the cells.

ENCHIDIUM. *(W. J.)*

Monoecia Monadelphia. N. O. Euphorbiaceæ. Juss:

Calyx 5-partitus. *Corolla* 5-partita. *Nectarium* glandulæ decem. *MAS*: *Filamentum* columnare, 10-antheriferum; antheris radiatim patentibus. *FEMINA*. *Ovarium* trilobum. *Styli* 3. *Stigmata* 6.

Flores masculi et feminei in eadem spica.

ENCHIDIDUM VERTICILLATUM.

Arbor spiculorum. *Rumph: Amb: III. p.* 167. *t.* 106.

Not unfrequent on hills in Sumatra and the Malay islands.

A large shrub; I have not met with any that had attained to so great a size as mentioned by Rumphius. The *Leaves* are arranged in a kind of irregular verticils at different distances along the branches, as exhibited in the figure quoted; on the young shoots they are sometimes irregularly disposed along the whole length; they are petiolate, lanceolate, acuminate, very entire, very smooth, firm and somewhat leathery, of various length, generally about 6 inches long by 2½ broad. *Petioles* from 1 to 2½ inches long, flattened above, striated. *Spikes* from among the upper verticils of leaves, bearing both male and female flowers, the former lowermost, all pedicellate. *Calyx* 5-parted. *Corolla* purple towards the centre, 5-parted, furnished with 10 callous nectaries or glands at the base. In the *male* the filament is columnar, bearing 10 anthers which diverge in a radiated circle round the summit. The *female* has a 3-lobed ovary surmounted by 3 styles with bifid stigmata.

Obs.—There can be little doubt of the identity of this plant with Rumphius's Arbor spicularum, of which he says he was never able to procure the flower. I have seen great numbers of these plants in the woods, but only once was successful in observing the flower, and have never met with the fruit. As the spike however fortunately contained both male and female flowers, its characters have been sufficiently determined to assign its proper place. It comes nearest to Cluytia, but differs in the corolla and in having ten anthers with filaments united into a central column. Both its fructification and habit appear to distinguish it from all the present genera of the Euphorbiaceous family.

XXXIX. STILAGINEÆ.

ANTIDESMA FRUTESCENS. *(W. J.)*

Frutescens, foliis oblongo-ovalibus basi rotundatis supra glabris, racemis terminalibus et axillaribus subpaniculatis geminis solitariisque, nectarii glandulis quinis cum staminibus alternantibus.

Bencoolen.

A small dioecious shrub not exceeding a few feet in height. *Branchlets* tomentose. *Leaves* alternate, petiolate, oblong-oval, rounded and sometimes subcordate at the base, acute, sometimes terminated by a short mucro or awn, entire, smooth above, subtomentose beneath, chiefly on the nerves; three inches long. *Stipules* long, subulate, acute. *Racemes* axillary and terminal, geminate and solitary, somewhat panicled, tomentose; when geminate, the outer raceme is simple, and the inner branched; male racemes generally longer than the leaves, female ones shorter. *Panicles* solitary. *Bracts* shorter than the pedicels. *Male, Calyx* 5-parted, tomentose. *Nectary* of five yellow pilose glands alternating with the stamina. *Stamina* 5; filaments much longer than the calyx; anthers bifid, cells bursting transversely on the summits of the lobes. *Pistil* abortive, pilose. *Female, Perianth* 5-parted. *Ovary* superior, villous, oblong-ovate, compressed, one-celled, vesicular, containing two ovula which are attached close together to one side near the top, and hang forward into the cell which is in great part empty and inflated. *Styles* 2, one often bifid. *Drupe* subglose, purplish, about the size of a pepper corn; nut 1—2 seeded.

Obs.—It has considerable resemblance to Roxburgh's *A. pubescens;* that however is a tree, while this is a small shrub. The most important difference appears to be in the nectary of the male flowers.

XL. FLACOURTIANEÆ.

FLACOURTIA INERMIS. *Roxb.*

Arborescens inermis, floribus hermaphroditis fasciculatis axillaribus, foliis ovatis serratis glabris.

Koorkup. *Malay.*

Sumatra and Pulo Pinang.

A tree of moderate size. Leaves alternate, short petioled, ovate, obtusely acuminate, with large blunt serratures, very smooth, lucid, from six to eight inches in length. Peduncles fasciculate in the axils, many flowered. Flowers hermaphrodite. Calyx 4-leaved, spreading, somewhat tomentose, leaflets subrotund, sharpish. Corolla none. Nectary composed of numerous, small subrotund, orange colored glands, situated at the base of the calyx and surrounding stamina. Stamina umerous, (20—30) hypogynous, longer than the calyx; filaments white, anthers yellow, subrotund. Ovary superior, ovate, crowned with 4—5 short thick diverging styles; stigmata capitate, two-lobed. Berry reddish purple, with a juicy acid flesh, in which are imbedded from 8 to 10 pyrenæ according to the number of the styles.

The fruit of this though rather too acid to be eaten in its raw state, is much esteemed in tarts and pies.

*On some remarkable Plants in the H. C. Botanic Gardens, Calcutta.** *By* W. Griffith, Esq., *F. L. S., Memb. Acad. Nat. Curios., Royal Ratisb. Bot. Soc., Assist. Srug. Madras Establishment.*

JENKINSIA.

FAMILIA NATURALIS—THYMELEÆ.

Char: Gen:—*Flores* dioici. *Perianthium* calyculo vel involucello cinctum; masculum hypocrateriforme, fauce impervia esquamata. *Stamina* totidem alternantia! fauci inserta, nullo modo inclusa. *Fœmineum* suburceolatum, pro-

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* Acting on the law established in Zoology, on the authority of the Committee of the British Association, (herewith quoted,) and which is applicable with equal correctness to the sister science, I have omitted altogether the MSS. names the plants, now for the first time described, bear in these Gardens, because they do not appear to have been established on descriptions, much less on definition.

" *Names not clearly defined may be changed.*—Unless a species or group is intelligibly defined when the name is given, it cannot be recognized by others, and the signification of the name is consequently lost. Two things are necessary before a zoological term can acquire any authority; viz. *definition* and *publication.* Definition properly implies a distinct exposition of essential characters, and in all cases we conceive this to be indispensable, although some authors maintain that a mere enumeration of the component species, or even of a single type, is sufficient

funde 4—5 partitum. *Stigma* terminale. *Ovula* 2, pendula. *Drupa* nuda, putamine areolato. *Albumen* copiosum.

Frutex *volubilis*. Folia *alterna, oblonga*. Capituli *florum nudi, racemosim dispositi, longiuscule pedunculati*. Flores *virides, inconspicui*. Baccæ *miniatæ*. Cotyledones *planæ*.

Jenkinsia Assamica.

Descr:—Frutex scandens, volubilis; corticis tenacis superficies paleis brevibus sub-asperata.

Folia alterna; petiolus paululum supra basin articulatus ibidemque incrassatus, teretiusculus; lamina oblongo-obovata, (vel f. superiorum oblongo-lanceolata,) subintegra, sæpius oblique acuminata cum mucrone obtusiusculo, longitudine 6½ uncialis, latitudine 3½ uncialis; venæ secondariæ arcuatim nexæ, interveniis venulis tertiariis subtransversis irregularibus divisis, cæterum reticulatis.

Inflorescentia sæpius supra-axillaris, dioica, racemosa, interdum subumbelliformis. Pedunculi bractea inconspicua suffulti. Flores masculi capituli cujusque numerosi, virides, inconspicui, basi calyculo 5-dentato vel 5-phyllo cincti. Perianthium 4—5 partitum, laciniis nigro punctulatis. Stamina 4—5, cum sepalis alternantia. Filamenta brevia, basi quasi connata et faucem obclaudentia, patentia. Antheræ lineari-acuminatæ, biloculares.

Flores fæminei non visi. Fructus capituli cujusque subquini, pedunculum subuncialem furfuraceum terminantes, drupacei, stipitati, oblongo-ovati vel elliptici, compressi, apice coronati stylo brevi et stigmate terminali discoideo lineis 4 cruciatis notato, basi stipati perianthio persistentiore profunde 4—5 partito reflexo; circa hujus basin calyculus

to authenticate a genus. To constitute *publication*, nothing short of the insertion of the above particulars *in a printed book* can be held sufficient." And with regard to MSS. names it is distinctly stated that they "are in all cases liable to create confusion, and it is therefore much to be desired that the practice of using them should be avoided in future." —Report, 1842. On Zoological nomenclature, p. 9.

ad basin fere 4-partitus, laciniis cum perianthii laciniis alternantibus. Stipes drupæ tubum perianthii implet et apicem versus dentes minutos sepalis alternos exhibet. Caro mediocris. Putamen angulatum, conspicue reticulato-areolatum. Semen pendulum, ovulo abortivo hinc adjecto; tegumentum simplex, tenuissimum, raphe lineari semi-completa* notatum, et chalaza brunnea indistincta. Albumen carnosum, copiosum. Embryonis orthotropi radicula brevis supera, rotunda. Cotyledones planæ. Plumula inconspicua.

Hab.—Sylvæ prope Sadiya, regionis Assamicæ superioris.

This genus is dedicated to Major Jenkins, as a mark of respect for his great exertions in investigating the Botany of the province, over the affairs of which he so successfully presides.

The plant was first found during the visit of the Tea Deputation to Upper Assam, subsequently, (A. D. 1836), I ascertained that it was not uncommon in the forests between Sadiya and the Mishmee Mountains. It also appears to be a native of Sylhet or the Khasiya Hills; the specimen, from which the drawing of the male Plant in the H. C. Library was made, having, I am informed, been procured from that quarter.

The genus appears to me easily distinguishable from any other of the family,† by the calyculus, the structure of

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* This is the ordinary form of raphe. But as instances are not uncommon in which the raphe is continued onwards to the true apex of the ovulum, in which case I call it "raphe completa," the above distinction in terms appears to me necessary. From this form again, those require to be distinguished in which the raphe does not apparently cease at the chalaza, but becomes ramified in the outer integument. The most important particular in the raphe completa is, that its termination does not obviously correspond with the apex of the cotyledons.

† The nature of the fruit of this family appears to me not sufficiently attended to in Endlicher's Gen: Plantarum. For instance in Daphne cannabina and viridiflora it appears to me to be a one-seeded berry, the seed coat being the indurated part; yet it is described as a drupe.

the male flowers, the situation of the stamina, and the copious albumen. Lagetta is the only genus recorded as presenting more than one ovulum.

The description of the male flower should be viewed with doubt, since the tube of the so-called hypocrateriform perianth may be a pedicel, which view is suggested by the drawing from which this part of the description was taken. And this is perhaps also suggested by the situation of the abortive stamina of the female flower, which are to be found in the form of minute projections from the surface of the stalk of the fruit close to its apex. This seems to me to indicate a tendency to separation in the verticilli of which the flower is composed.

The other plants of this family that I have met with on the N. E. frontier and Straits of Malacca, localities that, however distant, present remarkable affinities in vegetable forms, are—

Daphne cannabina, Lour. Bootan. Khasiya Hills.
——— involucrata, Wall. Khasiya Hills.
——— sp. ——————— Naga Hills.
——— Gardneri, Wall. Bootan.
——— ——————— Mishmee Mountains.
——— viridiflora, Wall. Mergui.
Linostoma decandrum. Wall. Khasiya Hills.
———— pauciflorum.[*] Singapore.
Enkleia malaccensis.[†] Malacca.

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[*] Linostoma pauciflorum, foliis obovato-ellipticis apice rotundatis cum mucrone cuspidiformi, umbellis 2—3 floris, tubo perianthii et fauce intus glabris.

Hab.—Colles prope Statiya Singapore.

Frutex subscandens. Folia quam folia L. decandri 2—3-plo minora; floralia magis membranacea. Flores graciliores, et squamæ multo minus staminiformes.

[†] Enkleia.—*Perianthium* tubulosum, limbo 5-fido, (erecto.) *Squamæ faucis* totidem alternantes, (bifidæ vel bilobæ.) *Stamina* 10; filamenta brevia, antheræ seriei superioris tantum semi-exsertæ. *Stylus* subter-

Thymeleæ appear to me to be essentially distinguished by the imbricate perianthium, and the anatropous ovulum (or ovula,) pendulous from near the apex of the ovarial cavity. Consequently I would not follow Dr. Lindley* in referring to Thymeleæ, Exocarpus and Anthobolus, genera characterised by Mr. Brown as "Santalaceis affinia; fructu supero diversa." The remarkable degree of affinity that exists between Leptomeria, an undoubted Santalaceous plant, and Exocarpus, also appears to me to indicate that characters, derived from the situation of the ovarium, will in this family be found of subordinate value. The decided opposition to the above two assumed essential characters presented by Cansiera,† appears to me conclusive against admitting it,

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minalis. *Stigma* inclusum, globosum, papillis aperum. *Fructus* drupaceus, nudus. *Semen* exalbuminosum.

Frutex *scandens.* Folia *alterna vel subopposita, subelliptica, subtus pubescentia; venæ secondariæ distinctæ, reticulatio obscura.* Capituli *florum subconici, longe pedunculati, racemoso-paniculati, 1-bracteolati.* Pedunculus *florum medium versus folia bina approximata vel subopposita, inconspicua, canaliculata gerens: fructûs elongatus, et ob folia floralia ampliata scariosa reticulata conspicuus.* Flores *capituli cujusque pauci, inconspicui, in pedicellum brevissimum articulati.* Drupa *saepissime solitaria ! subrotunda, basi perianthio spathaceim fisso sæpius stipata.*

Flos fere Gnidiæ. Habitus plantæ fructiferæ linostomaceus.

Enkleia malaccensis.

Hab. Malacca.

Genus Linostomati propinquum, discrepans laciniis perianthii erectis brevibus et minus petaloideis, staminibus subinclusis, et stigmate papilloso incluso. Folia etiam tantum subopposita, et floralia per anthesin inconspicua, nulloque modo petaloidea.

* Intr: Nat: *or*: Ed. 2. p. 195. Dr. Lindley is of opinion that the superior fruit is of more importance than the position of the ovula. But so far as I know Botanists had not observed the ovula of either of the two genera alluded to, when Dr. Lindley recorded this remark. It would indeed appear from Endlicher's Genera, that the observations have not been made up to this time.

† Cansiera.—*Perianthium* tubuloso-urceolatum, 4-fidum (æstivatione valvatum.) *Stamina* 4, perianthii laciniis opposita. *Glandulæ* vel

as the majority of Botanists appear to do, among Thymeleæ: and if its obvious affinity with Leptonium* and of

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squamæ hypogynæ totidem alternantes. *Ovulum* 1, nucleare, pendulum e placenta centrali libera. *Embryo* inversus in axi albuminis carnosi. *Flores* spicati, solitarii in axillis bractearum.

Frutices *scandentes.* Folia *alterna, ovato-acuminata.* Drupa *perianthio basi stipata.* Cotyledones *(saltem in planta malaccensi) ternæ !*

C. zyziphifolia, pubescens, foliis ovatis breviter acuminatis, drupis globosis.

Hab. Malacca.

Mr. Bentham(1) refers this genus to Olacineæ, describing it as having a minute calyx; it forms with Opilia his second group Opilieæ.

The third group Icacineæ, in which Mr. Bentham, I believe correctly, includes Gomphandra, (which will have, probably, to give way to Stemonurus Blume,) cannot in my opinion be admitted into Olacineæ, owing among other things to the very different position and structure of their ovula, the apex of the nucleus of which corresponds in direction with the radicle of the embryo, exhibiting an instance of "embryo orthotropus, radicula supera." On the want of correspondence in direction between the apex of the nucleus and the radicle of the embryo in Santalaceæ, and the group to which I have alluded in this communication, and on the extraordinary modifications in which it results, at least in Santalum, Osyris and Thesium, I am disposed to attach great importance.

Of the family Olacineæ I have an undescribed genus, (No. 366, 849a Herb. Mergui,) very remarkable for the albumen being divided into a number of lobes, between which dips the very fine integument, which is as remarkable an instance as any hitherto recorded, of the presence of spiral cells and vessels.

Mr. Bentham attributes to Olacineæ a simple pistillum, but to me it appears as compound, as I take it to be in Santalaceæ. So that it may be said that the ovarium of Olax, as well as that of Schæpfia among Santalaceæ, has partial true rather than partial spurious septa.

I have only to add that I came to the conclusion regarding the ovulum of Cansiera and Leptonium, and the affinity of Opilia, before I had the advantage of seeing Mr. Bentham's paper.

* LEPTONIUM.—*Perianthium* urceolatum, (œstivatione valvatum). *Stamina* 4, perianthii laciniis opposita. *Squamæ* hypogynæ 0. *Ovulum* 1, nucleare, pendulum e placenta centrali libera. *Embryo* inversus in axi albuminis carnosi. *Flores* racemosi, terni in axilla bracteæ cujusque.

(1) Linn. Trans. 18. pt. iv. p. 679.

this genus with Opilia, of Opilia with Champereia,* and of the latter with Exocarpus and Leptomeria, be kept in view, it appears probable that these form a group intermediate between Santalaceæ and Olacineæ, into both of which families some of the genera gradually pass. The main characters of this group, considered with regard to Santalaceæ and Olacineæ, I take to be the tendency to singleness of the floral

Frutex *subscandens.* Folia *alterna, oblonga.* Racemi *aggregati, juniores bracteis majusculis membranaceisculis laxe imbricatis stipati.* Flores *minuti, virides, centrales præcociores. Tubus* perianthii *carnosus, faux subannularis.* Drupa *oblonga.* Cotyledones *ternæ!*

L. oblongifolium.

Hab. Assamia superior.

Genus Cansieræ proximum, inflorescentia Opiliæ.

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* CHAMPEREIA.—*Perianthium* 5-sepalum, rotatum. *Stamina* 5, basi laciniarum inserta. *Annulus* 5-lobus, hypogynus, inter stamina et pistillum. *Ovarium* superum. *Ovulum* 1, erectum, nucleare, anatropum. *Stylus* 0. *Embryo* inversus in axi albuminis carnosi. *Inflorescentia* paniculata.

Frutices vel arbusculæ *incolæ oræ Tenasserim et freti Malaccensis.* Folia *alterna, ovata vel lanceolata, acuminata.* Flores *minuti, fuscescentes, racemoso-paniculati.* Bracteæ *minutissimæ.* Sepala *revoluto-reflexa.* Annuli *lobi sepalis alterni.* Ovarium *annulo reconditum.* Drupa *oblonga.* Cotyledones *ternæ!*

Genus meo sensu Leptomeriæ et Exocarpo propinquum; a præcedente distinguitur inflorescentia, ovario supero, et drupa ecoronata, a posteriore pedunculo fructûs immutato, disco, habitu et inflorescentia. Opilia dignoscitur calyce (an semper?), glandulis discretis, et inflorescentia. Habitus quodammodo Opiliæ (Groutia) celtidifoliæ.

I have experienced great difficulty in ascertaining from dried specimens the exact nature of the ovulum, more particularly as in my notes made at Mergui some years since, it is represented as an antitropous, erect ovulum. But as in the dried specimens, I find the central body to be gibbous on one side, I prefer, particularly as it corresponds with the affinities of the plants, considering it to be analogous to a true Santalaceous ovulum. Otherwise I am not acquainted with any clear mark of distinction between an erect, nucleary, anatropous ovulum, and an antitropous ovulum, otherwise of the same degree of development, attached to a central placenta, and with its apex presented to the fundus of the ovarium.

envelopes, in combination with the superior ovarium, and the single ovulum. The chief characteristics of the *whole* group (or class?) appear to me to be the valvular perianthium, the central free placenta bearing one or several ovula, the apices of whose nuclei point to the fundus of the ovarium, and the *inverted* embryo in the axis of copious albumen. This will exclude Mackaya. Arnott, which nevertheless has strong affinities with Santalaceæ.

All these plants, so far as can be judged from the comparison of the direction of the apex of the nucleus, and that of the radicle of the embryo, will probably be found to present the same remarkable development of the seed, that has been noticed in Santalum, Osyris, and Thesium. This appears to be more worthy of notice, because in certain Verbenaceæ, in which the placenta and ovula are very like these bodies as they exist in Olax, Schæpfia, Santalum, Osyris and Thesium, the radicle of the embryo points, as it would be expected to do, to the fundus of the fruit; and in Avicenna means are resorted to for preserving this normal direction, as extraordinary as those occurring in the Santalaceæ hitherto observed, by which the inversion of the embryo is brought about.

EXPLANATION OF PLATE XII.

Jenkinsia Assamica.

1. Portion of a male Plant.
2. 2. Flower of ditto.
3. Stamina of ditto.
4. Female capitulum, *in fruit.*
5. A fruit detached with its perianth and involucel.
6. Section of fruit, so as to expose the pyrena.
7. Seed, ventral face.
8. Long section of seed.
9. Transverse section of ditto.
10. Embryo detached, one cotyledon removed.

Figs. 1, 2, 2, 3, from a drawing in H. C. Library.

ROXBURGHIA.

Stemona. Loureiro *Fl. Cochin.* 404. Ubium polypodioides. Rumph. *Hb. Amboyn.* 5. t. 129.

*Tetrandria Monogynia. Roxburghiaceæ, Lindl.**

Char. Gen.—*Perianthium* biseriatim 4-sepalum. *Stamina* 4, antheræ adnatæ, connectivis ultra loculos longe productis cuspidatæ, mediantibus loculis ad bases cuspidum liberifactis effetis intus productis cohærentes. *Ovarium* 1-loculare; ovula 00, erecta, anatropa, placentis 2 basilaribus lateralibus affixa. *Stylus* 0. *Stigma* subpennicillatum. *Fructus* siccus, 1-locularis, bivalvis. *Semina* funiculata, funiculis vesicularibus vel stuposis. *Albumen* copiosum. *Embryo* axilis in parte inferiore albuminis, plumula intus rimam recondita.

Herbæ *perennes, scandentes.* Radices? *tuberosæ.* Folia *sæpius opposita, e basi plus minus cordata ovato-acuminata, costata venis pluribus primariis, venulisque transversis has connectentibus pulcherrime striata.* Flores *axillares, solitarii, vel bini in pedunculo, magni, striati, fœtidi.* Fructus *perianthio persistente suffultus, margine utroque sulco exaratus.*

The observations I have made on R. viridiflora regard chiefly the stamina, pistillum and embryo, the first having been entirely misunderstood by many; the last as detailed by Dr. Lindley, tending in my opinion to disturb the natural relations of the genus.

I have ascertained from observation at all periods, that the real structure of the stamina is what I have attempted to describe in the generic character. And indeed, this is

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* The practice of permitting a Botanist's name to be attached to a family, of the definition appended to which he is not the author, appearing to me to be very objectionable, I have substituted Lindley, the name of the author of the definition, for Wallich.

sufficiently obvious in the mature stamen, the appendage not only being a direct continuation of the loculus, but also presenting a continuation of the ordinary central sulcus, indicating the division of the loculus into two locelli, and very generally also the line of dehiscence. I have not been able to ascertain why Roxburgh described the cells or anthers as separable to such an extent from their attachment, so as subsequently to become pendulous from the appendages, in which state they are represented in one of the details of the original drawing of R. gloriosoides.* An anther cell only partially polliniferous is not, I believe, of uncommon occurrence, the deficiency of function possibly, perhaps, affecting indifferently every part of the anther. But the separation of the effete *upper* part occurring, as it does here, in so marked a degree of the adnate form of anther appears to me very curious.

I have also ascertained, that the pistillum is distinctly monocarpellary, a structure otherwise suggested by the obliquity of the ovarium. The most remarkable part of the structure of the pistillum, however, has regard to the placentæ, which I have not found to present in any stage any definable relation with the margins, or indeed with any part of the carpel leaf. In their earliest state, they appear as a disc occupying the fundus of the carpel cavity, and terminating the axis. Shortly after this disc presents a depression in the centre. Subsequently it appears placentiform, with a concave centre, and thickened undulated sides, and at the time when the ovula are becoming anatropous, a double longitudinal section, across the short diameter, presents it as occupying two elevated lines (the sides just alluded to,) which run parallel to the sides of the carpel leaf. This is the state in which the placentæ exist in the expanded flower and in the fruit.

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* Icones Roxburghianæ, v. 7. t. 70.

This appears to me best intelligible as a placenta derived from the axis. It will be seen, however, that its parts have the ordinary numerical relation with the carpel leaf, to which, moreover, its development may be considered to be subsequent.

I have not been able to trace any continuity between any parts of the surface of the placentæ and the stigmatic tissue, which, however, resembles that surface in colour and appearance. But it appears to me probable, judging from the situation of the foramen of the ovulum, that conducting tissue does line the inner paries of the ovarial cavity.

The description of the embryo is derived from observations made in June 1835, and since verified.

This genus is stated by Sir J. Smith,* to have been founded by Mr. Dryander, at the suggestion of Sir Joseph Banks, in just commemoration of Dr. Roxburgh, the first Superintendant of these Gardens. It appeared first, I believe, in the Coromandel Plants of Dr. Roxburgh, a work munificently patronised by the Hon'ble Court of Directors, but of which, no complete copy exists in this institution. It was referred to Octandria Monogynia by Dr. Roxburgh, who appears to have considered the filaments as petals, the abortive upper parts of the anther cells as nectaria, and each cell of the anthers as an entire anther; which view appears to have been very generally adopted.†

The next author who appears to have described the genus is Sir J. Smith,‡ who referred the genus to Tetrandria Monogynia, and gave a much more accurate description of the stamina, considering the appendages as abortive anthers.

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* Rees' Cyclop. in loco.

† Willdenow. Sp. Plant 2. pt. 1. 321:—Lamarck Enc. Meth. 6. 319.—Persoon, Synop. 1. 412.—Aiton. Hort. Kew. ed. 2. v. 2. 347.—Sims. Bot. Mag. t. 1500.—Sprengel. Syst. Veget 2. 214.—Poiret. Dict. Sc. Nat: 46. 377.

‡ Exot. Bot. 111. t. 57. Rees' Cyclop. in loco.

Loureiro, who published the genus under the name Stemona,* (A. D. 1790,) referred it to Monadelphia Tetrandria; he notices the appendages as "laciniæ," and appears to have had a correct view of the anther cells, although his description is not exactly applicable to either of the Indian species.

Nevertheless, in M. Endlicher's Genera,† the view entertained by Dr. Roxburgh is reverted to, with the difference, that the anthers are represented as 4, bilocular, and the appendages as connectiva! In addition, the ovarium is said to be formed of two carpel leaves.

There is a good deal of variety of opinion also regarding the locus naturalis of this remarkable genus. Sir J. Smith‡ referred it without difficulty to the Asparagi of Jussieu.

Lamark§, says, it appears to be intermediate between Liliaceæ and Asclepiadeæ, an opinion he doubtless derived from Dr. Sims.||

Reichenbach¶ places it in his family (class) Aroideæ at the end of the second section Taccaceæ, subsection Tacceæ: the merit of this, however, appears to me reduced, by his placing Nepenthes and Sarracenia with Peliosanthes in the last section of the same family.

Bartling** places it among the "genera Monocotyledonéa dubia l. incertæ sedis."

Dr. Lindley†† in Wallich's Pl. Asiat. Rariores, characterised it carpologically as a distinct family, Roxburghiaceæ, being evidently influenced a good deal by the supposed absence of the Aroideous form of embryo. The place of this family is considered to approach "the Aroideæ more nearly than any other tribe."

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* Fl: Cochinchin. 404.—This genus is also adopted, in the Encyclopedie Methodique. Supp. 5. p. 244, and in the Dictionaire des Sciences Naturelles, v. 50. p. 478, in which last it is referred to Tetrandria Monogynia.

† 157. No. 1197.

‡ Ex. Bot. loc. cit. Rees' Cyclop. loc. cit.

§ Enc. Meth. loc. cit.

|| Bot. Mag. loc. cit.

¶ Consp. Reg. Veget. p. 44.

** Ord. Nat. p. 76.

†† 3.49. t. 282.

Subsequently in his Nixus, he associated Roxburghiaceæ with his Retose class, in which it will be found in his Introd. Nat. Orders, ed. 2. p. 360. Somewhat later it is to be found similarly associated in his class Dictyogens.*

M. Endlicher,† places it among the "genera Smilaceis affinia," *still* however retaining the family name Roxburghiaceæ. Sprengel‡ refers it to the Smilaceæ of Mr. Brown.

The genus appears to me to belong to the class of which Aroideæ are the type. It consequently appears to me singular, that no allusion is made to this genus by Schott and Endlicher, in their Meletemata, in which the *class* Aroideæ is considered, or by Blume in his Rumphia, in which the *family* is noticed in detail.

There are two British Indian species of the genus, which may be thus characterised.

Roxburghia gloriosoides, foliis alternis vel oppositis basi cordatis, fructibus obovatis, seminum exapiculatorum funiculis celluloso-vesicularibus.

R. gloriosoides. Dry. in Corom. Pl. 129. t. 32. Icon. Roxb. 7. t. 67.§ Hort. Kew. v. 2. 348. Roxb. Fl. Indica. 2. 234. Lam. Enc. Meth. 6, 319. R. gloriosa. Pers. Syn. 1. 412.

Flores straminei venis ochroleucis striati. Sepala acuminatiora. Filamenta purpurascentia. Loculi antherarum lutei; connectivorum processus curvati.

Habt. in Mont. Circars dictis. Roxburgh.

Roxburghia viridiflora, foliis oppositis basi cordato-ovatis, fructibus oblongis compressis, seminum apiculatorum funiculis apicem versus stuposis.

R. viridiflora, Sm. Exot. Bot. 111. t. 57. Rees' Cyclop. in loco. Lindl. in Wall. Pl. As. Rar. 3. 49. t. 282. R. Gloriosa. Bot. Mag. t. 1500.

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* Elements, p. 236. † Gen. Pl. loc. cit. ‡ Gen. Plant. 2. 815. No. 1586.

§ The drawing in the Cor. Pl. differs remarkably from the original one, of which otherwise it appears to be a copy, in the shape of the leaves which are reniform cordate, and not, as in the original, ovate from a subdeltoid base.

Flores triplo majores, odore ingratissimo, virides, intus ad basin lurido-purpurascentes, venis purpureis striati. Stamina maxima, sub-uncialia, filamenta saturate purpurascentia, connectivorum processus stricti virides, antherarum loculi livide purpurei.

Habt.—Assam: Montes Khasiyani—Chittagong et ad littora sinus Siamensis. Colitur in Hort. Bot. Calcutta.

A third species would appear to exist in Loureiro's Stemona tuberosa,* and a fourth in the Ubium polypidioides of Rumph.† This however, was considered by Buchanan, as appears from a MSS. note on the back of Rumphius's figure in the copy in the H. C. Library, to be the original species, R. gloriosoides.

PLAGIOPTERON.

CHAR. GEN.—*Sepala* 3—4, minuta, dentiformia. *Petala* totidem (calycina), œstivatione valvata, revoluta. *Stamina* 00, hypogyna, filamenta capillaceo-clavata, antheræ biloculares, terminales. *Ovarium* superum, 3-loculare; ovula cujusque loculi dua, collateralia, erecta, anatropa. Stylus subulatus. *Fructus* nucamentaceo-samaroideus, 3-locularis, loculis dorso (apicem versus) ala lingulata transversa præditis. *Semina*...

Frutex *scandens, pilis stellatis pubescens, habitu Hiraeæ.* Folia *opposita, exstipulata.* Inflorescentia *axillaris, thyrsoidea.* Flores *parvi, ob filamentis albis conspicui, suavissime odorati.*

Plagiopteron suaveolens.

DESCR:—Tota pubescens pilis stellatis, pallide ferruginea. Ramuli teretes. Folia breve petiolata, opposita, oblongo-ovata, cuspidato-acuminata, integra; venæ secundariæ tertiariis plurimis transversis connexæ, intervenulis reticulatis; vernatio conduplicata. Paniculæ subthyrsoideæ, axillares, foliis breviores. Bractea angusta, parva, subtus ramos, ramulos, et florem quemque. Flores numerosi, parvi, exquisite fragrantes; alabastra subglobosa. Calyx 3—4, sepalus, sepalis dentiformibus, minutis. Corolla 3—4 petala, viridis, petala oblonga, cum sepalis alternantia, æstivatione valvata, per anthesin revoluta, extus dense pubescentia. Stamina 00, subbiseriata, hypogyna, petalis longiora, æstivatione varie flexa, per anthesin erectiuscula. Filamenta capillaceo-clavata, alba. Antheræ terminales, ochroleucæ, demum brunescentes, loculi breves, adnati, (dehescentia quasi transversa). Ovarium superum, rotundum, dense piloso-pubescens, 3-loculare, loculis biovulatis; ovula erecta, anatropa, collateralia, raphe sub-introrsa. Stylus subulatus, glaber. Stigma obscure 3-dentatum. Fructus sub-turbinatus, apice plano stylum exserente, trilocularis, loculi subossei, dorso apicem versus ala transversa lingulata loculis 3-plo longiore subreticulata aucti. In singulo loculo ovula abortiva 2, erecta.

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* Fl. Cochinchin. loc. cit.

† Herb. Ambon. loc. cit.

This plant is said to have been introduced from Sylhet in 1829. It has not, I believe, ripened seed in the Garden.

It apears to me to present a curious mixture of characters. With the habit of Hiræa it has a resemblance in the flowers, especially the inner series of the floral envelope, to Rottlera or Trewia; the anthers again resemble those of Stilagineæ, while the pericarpium appears to me to represent in some respects that of Hiptage: the direction of the ovula however is contrary to what occurs in Malpighiaceæ or Euphorbiaceæ. Dr. Wallich appears to have considered it a doubtful Euphorbiaceous plant, a view suggested by the floral envelopes and male organs, but not by the pistillum or fruit, in which there seems no tendency to the characteristic Euphorbiaceous dehiscence. I am disposed to hazard a conjecture, that it will be found to unite Euphorbiaceæ and Malpighiaceæ, the probability of a direct relationship between these two families being suggested, among other things, by their glandular nature. And perhaps the majority of its characters will place it near Malpighiaceæ and Sapindaceæ, although the want of any correspondence in number between the floral envelopes and the stamina, and their indefinite

number in particular, will probably appear formidable objections.

It abounds with spiral vessels. Curious cellular bodies are to be found along the margins of the young leaves. The odour of the flowers resembles that of Roydsia suaveolens, and Heliotrope.

EXPLANATION OF PLATE XIII.

Plagiopteron fragrans.

1. Portion of a flowering branch, natural size.
2. Young alabastrum.
3. Alabastrum just opening.
4. Flower.
5. Two Stamina.
6. Anther before dehiscence.
7. Ditto after.
8. Pollen.
9. Ovarium laid open, disclosing the ovula of one cell.
10. Ditto, a double longitudinal section.
11. Ovarium, double transverse section.
12. Ovulum.
13. Fruit.
14. Ditto, one cell opened, shewing the two abortive ovula at the base.
15 Stellate hair.

SIPHONODON.

Char. Gen.—*Flos* hermaphroditus, semi-inferus, æstivatione imbricativa. *Calyx* 5-sepalus. *Corolla* 5-petala. *Stamina* 5, sepalis opposita, antheræ reniformi-cordatæ. *Ovarium* plurilocellatum, e carpellis 5 sursum in canalem (apice denticulatum) connatis, formatum. *Stigma* styliforme, in canalem, apice discoideo excepto, reconditum. *Ovula* in loculis solitaria, obliqua vel pendula. *Fructus* drupaceus, pyrenæ osseæ tot quot locelli ovarii, monospermæ. *Semina* pyrenarum superiorum erecta, inferiorum pendula.

Arbor *mediocris, freti Malaccensis incola, corona conica densa.* Folia *alterna, minute bistipulata, coriacea, crenato-serrata.* Flores *axillares, racemosi vel solitarii, inconspicui.* Fructus *subglobosus, vertice umbilicatus.* Habitus *Celastrineus.*

Siphonodon celastrineus.

Arbor mediocris, corona conica densa. Ramuli flexuosuli. Folia alterna, bistipulata, stipulis (lobi folii) dentiformibus minutis.* Petiolus brevis. Lamina oblonga, obtusiuscula,

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* By this term I wish to express my idea of the stipulæ of this particular plant. I am inclined, moreover, to attribute a similar origin to these organs in all cases, and they are by far the most numerous, in which they have, at some period at least, an ascertainable connection with the leaf to which they are referred. At an early period of their development they answer with sufficient exactness to the above term.

In such instances, however, of interpetiolar stipulæ as I have examined, chiefly in tropical Rubiaceæ and in Rhizophoreæ, I have scarcely ever found these organs to present *in initio* the required division, although their composition has been subsequently ascertainable either from the division of the apex, or from the source of the vascular supplies, *which* last is still more, perhaps, decisive of their origin.

The question, so much discussed, of the real nature of some of the component parts of the verticilli of foliaceous organs in Galium and its allies, appears to me to be only capable of solution by examination of the sources of their primary vascular bundles. For I have seen in *Coffea bengalensis* occasional appearances indicating the possible derivation of an apparently true lamina from two stipulæ, which, as usual, derived their vascular supplies from those given off to the leaves.

In connection with leaves I may remark, that their divisions are originally independent of the presence of vascular, or fibrous, or of any elongated form of tissue. Any hypothesis, therefore, which endeavours to establish the relation of cause and effect between the nerves or veins and the divisions of leaves must, it appears to me, be erroneous. So far as I have enquired into the subject of the development of these organs it has been apparent, that all leaves are simple and cellular *ab origine*, the degree of division being dependent on the degree of development, so that the most complex form of leaf, such as a "folium tripinnatum vel supra decompositum" would present at different periods all the different degrees of division, which Botanists distinguish by so many terms. The

crenato-serrata cum mucronulis adpressis, semi-conduplicata, coriacea, venis secondariis arcuatis reticulatim nexis; vernatio conduplicato-involuta.

simplest theoretical form of leaf I take to be entire and cellular, the first step in complication resulting from the extension of an axile vein. And as reticulating veins are the last that make their appearance, it may be suggested that a Dicotyledonous leaf will at some period of its development present the appearance characteristic of a Monocotyledonous leaf.

The last observation I have to make refers to the Pitchers or Ascidia of *Nepenthes:* these, from observations on their development, I consider to be modifications of excurrent midribs. That such is their nature at first will, I imagine, on examination, be readily allowed. In this explanation the part which is developed like an ordinary lamina, looks like an ordinary lamina, and which performs the proper functions of an ordinary lamina, is the lamina; the apex of the excurrent midrib is the subulate process at the base of the lid, and the lid is a special development of the upper margin of the originally simple foveola or cavity, subsequently the pitcher. This explanation differs from that of M. Link, Dr. Lindley and Professor Morren, which agree in considering the foliaceous expansion as a dilated petiole—differing substantially, however, in the nature attributed to the pitcher itself and its lid. That hypothesis, indeed, which considers the lid to be the lamina or blade of the leaf, would, in my opinion, be much more consonant with appearances if the lid were considered as resulting from marginal cohesion of a folium unijugum.

I do not extend the above explanation to such instances as *Sarracenia etc.* still less, perhaps, to species of *Dischidia,* in which the pitcher can be traced, through a series of modifications, to the lamina of the leaf itself. In the instances presented by the last genus, whether the leaf be completely convolute, or merely concave, it always appears to perform some function connected with the radicular fibres.

In *Nepenthes distillatoria,* the species examined, the apex of every leaf will be found to present the cavity, which is to be subsequently, sooner or later, the ascidium. This, together with the fact that in *N. ampullaria* the leaves of the flower-bearing branches have no *developed* ascidia, these being limited to the short procumbent humifuse branches, may be considered perhaps an objection to the views of Mr. Link of their being floriform organs.

Flores axillares, solitarii, cymosi, vel racemosi, inconspicui, viridi-lutescentes. Pedicelli (florum solitariorum) petiolorum longitudine, medium versus articulati, ad articulos bibracteolati, et ad basin floris clavato-ampliati.

Sepala 5, inæqualia, concava, lutescenti-albida, diu persistentia. Petala totidem alterna, carnosa, margine subcrispata, concoloria, cum calyce perianthium rotatum exhibentia, decidua.

Stamina 5, petalis alterna, brevia; filamenta dilatata, basi mediantibus denticulis latis subinternis in annulum coalita; antheræ conniventes, connectiva reniformi-cordata, loculi angusti, marginales, longitudinaliter dehiscentes. Pollen album, 3-porosum, 3-gonum.

Ovarium semi-inferum depressum, lineis 5-radiantibus petalis oppositis vertice insignitum, pluriloculare, loculi quasi in substantia baseos floris immersi, subbiseriati verticaliter, obliqui, uniovulati. Ovula anatropa, angulo interiori affixa, sæpe pendula; tegumentum unicum. Stylus brevis, canaliformis, apice dilatatus et 5-denticulatus. Stigma discretum, columnare, apice discoideum, canalem styli implens, disco exserto. Fructus superus, ima basi calyce vel hujus reliquiis stipatus, aurantii parvi magnitudine, apice profounde umbilicatus; Caro subsiccus. Pyrenæ tot quot loculi ovarii, compressæ, osseæ, superiores erectæ, intermediæ obliquiusculæ, inferiores pendulæ. Semina non visa.

This remarkable plant I am informed was brought from Penang about 1823. It does not appear to perfect its seeds.

The structure of the pistillum of this plant appears to me very remarkable. At the earliest stage at which it was observed, it appeared to me as a cone, occupying the axis, the base being surrounded by the puncta representing the future stamina.

At a later period I have observed it as a cone, the base surrounded by an annulus, which I consider to be derived from 5 carpel leaves. The subsequent radiating lines (costæ)

of these are well developed, their points projecting beyond the concave sinuses.

At a somewhat later period, the base of the central cone will be found concealed by the growth of the above annulus, and at the line of junction between its base and that of the cone, very young ovula may be detected, apparently attached round the whole base of the cone, and not presenting any manifest relations with the carpel leaves. At this time a double long section has not shewn me any solution of continuity[*] resulting from forcibly pulling back the carpel leaves, and thus exposing the ovula.

The next stage presented the central cone with a conical base, a cylindrical intermediate portion, and a dilated head. The carpel leaves will be now found to adhere by their bases to the corresponding part of the cone, so that the ovula cannot be exposed without tearing through tissue; the carpel leaves are also now produced upwards into a hollow cylinder, surrounding the columnar part of the original central cone; this cylinder is somewhat dilated at the apex, which again is 5-toothed, the teeth corresponding to the radiating lines.

At the time of expansion the circumstances remain much the same, the central columnar body remains distinct from the canal enclosing it, the ovula appear attached round the whole of its base, but not upon the same plane. The lines of communication, by which each isolated ovulum is placed in the usual conditions to receive the male influence, will be found to terminate on the circumference of the conical base of the central column.

Of this structure, as it exists at the period of expansion of the flower, four modes of explanation occur to me. It may be conveniently disposed of by the use of the term "ovarium disco* immersum," not unfrequently employed in the generic description of Celastrineæ.

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[*] M. Endlicher pointedly alludes to the necessity of accurately observing these discs. Gen. Pl. p. 1085.

Or the hypothesis may be resorted to, which assumes such a degree of confluent growth of the vertex of a syncarpous ovarium, as shall give rise to a tube similar to that described.

In both these hypotheses the central columnar body is to be considered as the style and stigma.

Or it might be assumed, that the component parts of the pistillum produce the placentæ from their margins close to the base, which placentæ becoming confluent and produced upwards free from any connection with the style, give rise to the central column.

Or lastly, the central columnar body may be considered as a continuation of the placenta, and as the termination of the axis; having no original connection with the carpel leaves. In these two modes of explanation, the canal becomes the style or analogous to it, and the central column a free stigma.

The "disc" hypothesis, however plausible it might appear if Hippocrateaceæ are taken into consideration, except indeed as regards the point of attachment of their filaments, seems to me contradicted by the general appearance of the radiated part, which manifestly belongs to the female organ, and equally manifestly forms part of the fruit. It would also necessarily result from its adoption, which may to those who favour De. Candolle's* hypothesis of the fruit of the Orange, still appear tenable, that the two inner series of developments viz. the teeth interposed between the filaments, and the component parts of the disc, which may be assumed to be of the same nature, would be in opposition, and moreover that the direction of their development would be inverted.

The second hypothesis, though perhaps not altogether improbable, is not, I think, borne out by any appearances during any stage of the development, and is, together with the preceding, contradicted by the solidity and homogenous structure of the column, in this light a style, which has seemed to me to present no traces of composition, or any such difference in texture between the superficies and centre, as might have been expected to be presented in some part at least; and also by the fact that the lines of communication with the locelli of the ovarium, and which, in my opinion, alone allow of the passage of boyaux, open on the surface of the base of the column.

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* Lindley Introd. ed. 2. p. 105.

The third mode of explanation, suggested by the irregularity in position of certain placentæ, and by the views of Mr. Brown*, regarding the origin of the stigma from the placentæ, is not borne out by development, which shews the central cone to be formed before the carpel leaves. Yet so far as my observations go, the placentæ when manifestly, as they so very generally are, referrible to the carpel leaves, are of considerably later development than the leaves to which they belong.

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* In a paper on the capsule of Papaveraceæ, and stigma of Cruciferæ by Mr. J. W. Howell,(1) the situation of the stigmatic rays of Papaveraceæ is explained by the assumption of their being compound, an opinion also held by Mr. Brown. There is also another partial coincidence of opinion regarding the improbability of the axis of a carpel leaf bearing ovula.

Mr. Howell, however, arrives at the conclusion that this composition of the individual stigmata of a syncarpous pistillum is only occasional, admitting the existence of simple stigmata in single carpels. Whereas Mr. Brown setting out from the consideration of the simplest form of the vegetable pistillum, advocates the opinion of their being always compound, explaining their apparent opposition by confluence.

From the note by the Editors appended to Mr. Howell's valuable paper, it might be made out that Mr. Howell's observations on the stigmata were of a more general nature than they are; whereas they are limited [illegible] Papaveraceæ, and further regard the difference between a Papaveraceous and Nymphæaceous stigma as an arbitrary one, "serving to separate by abruptly defined limits those otherwise nearly related orders."(2)

Both Mr. Brown's and Mr. Howell's observations appeared publicly in 1840; but there can be no doubt that so far as Papaveraceæ are concerned, Mr. Howell is anticipated by M. Kunth, whose observations appeared in 1838, "*in a printed book.*"

On this subject of the stigma, I have lately ventured to offer some remarks, derived from conclusions suggested to me independently of either Mr. Brown's remarks or the paper by Mr. Howell. The sub-

(1) Ann. Mag. Nat. Hist. v. 10. 65. p. 248.

(2) op. cet. p. 249.

The explanation that seems to me to accord best with observations of the development, and to explain also the general structure in the best way is, that the placenta in this plant is the conical termination of the axis, produced upwards into a styliform stigma, and bearing round its base, at or about the plane of insertion or attachment of the carpel leaves, a verticillate series of ovula. And if it be found to be correct, it appears to me strongly in favour of an opinion lately advanced by me that, even when the style is present, the stigma may be quite independent of it.

This hypothesis does not explain the appearances presented by the expanded flower more fully than the preceding, but then it appears to me to agree with the development, and especially the primary appearance of the central cone, and also with the evidently more intimate relations of the very young ovula with the base of the cone rather than with the margins of the carpel leaves. Moreover, a central axile placenta terminating in a stigma, appears to me

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tance of these consist of the possibility of the stigma being a continuation of the placental margins of the carpellum, of its being the external communication of the conducting tissue, which itself communicates with the placentæ, and is in several cases at least manifestly identical with them. That the phrase "stigmata opposite to the placentæ" arises from a cohesion between stigmatic surfaces, analogous to that cohesion which causes in fruits the loculicidal dehiscence. That Orobanche presents owing to this cohesion right and left stigmata, as is proved by development and the situation of the vascular fascicles of the style &c. &c. and that the stigma being an extension of a mere cellular surface need not present any definable form, and that it may exist independently of the style.

more reconcilable with a perfectly isolated stigma, than the occurrence of such a stigma, in connection with carpel leaves, from which it would then be supposed to originate, and with which consequently it should at some period present some degree of connection.*

A necessary consequence of such an isolation of the stigmatic tissues from the style, is that the course of the pollen tubes will be downwards over the surface of the central column. Appearances are I think in favour of this,† which is in accordance with the course of pollen-tubes in many, and perhaps in all cases, in which the stigmatic tissues are not confluent at any part of their extent. The term penetration, therefore, does not apply by any means invariably to any relation effected between the pollen-tube and any part of the female organ, except the ovulum, of which it affects only the nucleus and embryo-sac.

In either view it may be suggested from the small degree of union between the carpel leaves and placentæ, and particularly from their apparently absolute distinctness at an early period, and which is, perhaps, only reconcilable with my hypothesis, that such an arrest of development may occur, as shall present naked ovula in connection with carpel leaves so convoluted and connate as to present a perfectly distinct style.

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* I have not been able to satisfy myself of the exact limits of the carpel leaves. The first parts developed have appeared to me those opposite the stamina, in which case the rays may be considered as indicating the lines of union. The alternation in this case is regular. But immediately afterwards the parts opposite the stamina present concave edges limited by the now projecting rays, and the whole appearance suggests that the rays form the axes of so many carpel leaves. And although in this case the two innermost series of development, assuming the teeth between the stamina to represent an inner series of stamina, will be opposed, yet I prefer adopting it to the other view, which supposes the carpel puncta to present concave terminations, in other words, that their sides reach a greater elevation than their axes.

† It is also singular that the inner surface of the tube or style appears in some degree stigmatic, and presents after application of the pollen the usual appearances indicating the first steps of fecundation.

It is to be considered that the explanation I have attempted to give, is not at variance with those views of the origin of the placenta that originated, so far as I know, with M. Schleiden, and which are considered by many to afford the best explanation of the free central placenta. In this view the only anomaly is the want of the usual cohesion between the style and stigma: this, as I have said, appears to me less anomalous than it does if the third method of explanation be adopted. On the whole, therefore, I beg to propose this plant to Botanists, as an instance in which the placenta is the termination of the axis, bearing around its base a verticillus of ovula, and produced upwards into a stigma, a single organ, surrounded for the most part by an ordinary style with which it has no connection.

The venation of the carpels appears to me worthy of notice, they have no dorsal vascular fasciculi, deriving such partial supplies as they have appeared to me to present from the vessels supplying the ovula, which vessels appear derived from the fascicles, supplying the stamina or perianth.

Such a mode of distribution of course suggests the idea of a definite grouping of the ovula, and if the primary fascicles are derived from those running to the stamina, they have precisely the situation they should have if they were ordinary placentary fascicles of an ordinary syncarpous pistillum. The supposed grouping, however, I have not been able to detect, the primary fascicles dividing so as to present on a transverse section a circle of vessels surrounding the axis, and moreover *after* supplying the ovula, they pass into the substance of the carpel leaves.

I may also mention the curious circumstances, that though the general direction of the ovula may be considered as pendulous, and though the raphe is in all extrorse, many of the seeds must be erect and have the raphe introrse.

The genus appears to me to agree sufficiently well in character with Ilicineæ, to which family, I believe, Dr. Wallich referred it. It would appear, judging from the description, to present considerable affinities with Byronia.*

It has many points in common with Celastrineæ, with which it agrees entirely in habit.

EXPLANATION OF PLATE XIV.

Siphonodon celastrineus.

1. A Branchlet, somewhat reduced.
2. Flower.
3. Two stamina, viewed interiorly shewing the intervening tooth.
4. Stamen, inner face.
5. Pollen.
6. Pistillum, (vertical view.)
7. Ditto, double long section.
8. Ovulum,
9. Fruit, (as it occurs in the Botanic Gardens).
10. Ditto, longitudinal section.
11. Very young alabastrum laid open, presenting petals, stamina, and central cone.
12. Very young pistillum, lateral view.
13. Another pistillum about the same period: with the stamina spread back, the round dots are intended to represent the ovula which appear to be attached all round the cone.
14. Very young bud, double longitudinal section.

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* Endl. Gen. Plant. 1093, No. 5708.

The Sex and Generative Organs of Plants, in connexion with the Science of Morphology. By VON MARTIUS, *translated by* JOHN MACPHERSON, *Esq. Assistant Surgeon.*

All living things are kept in activity and in motion by two powerful impulses, which are the springs of existence: the impulses of self-preservation and of reproduction.

The first rules life from its beginning to its end: the second awakens later, does not last during the whole period of life, developes itself in many organisations only once, while in others it returns periodically, and disappears with the advance of years. Both impulses are in certain respects opposed to each other, and develop themselves often at their mutual expence; while subject to the impulse of self-preservation, the individual belongs only to itself and to the present; while subject to that of reproduction, it is of use to a something external to itself, and to the future. The latter impulse permits the multiplication of individuals, and secures to every *kind* of living being an uninterrupted continuance, while the individual organisations, decaying and temporary, last only a certain period of time, which is short in comparison with the life of the kind.

Obedient to this last impulse, the individual forms for posterity another individual exactly like itself in all its important relations. By it, life is continued, if not in individuals, yet in the whole; by it, living organisations perpetuate their inner and outer form, their activity and their peculiar vital functions.

To unfold, however, this last impulse for the production of a new life, there is required a certain kind of opposition in the state of action, and in the condition of the individual. Various powers must be put in action, and different shares have to be borne by certain particular parts. Such variety of organisation is, however, a necessary condition of life. What is dead, can alone be quite homogeneous—

what has life, always consists of different parts, (organs,) each of which possesses an especial action, a defined external and internal form, *(Morphosis)*; just as self-preservation, so also is reproduction worked out by certain more or less peculiar organs.

Wherever then, in living organisations, there is [illegible] be a multiplication of individuals or reproduction, we observe, as already remarked, a certain kind of opposition in the structure of the organism, which commences and completes that multiplication—in short, *organs of reproduction.*

These appear sometimes complete in a single individual, sometimes as belonging to two different ones. In the first case, the organs which are the medium of reproduction are very commonly formed after only one type, and produce new individuals by a gradual alteration in themselves, without any external visible action of different parts on each other, (constituting sexless reproduction.) In much more numerous cases however, two peculiar and differently formed organs, divided on two individuals, act upon each other in the externally visible act of fecundation; and multiplication and reproduction are sexual. Sexless reproduction in the vegetable kingdom, requires always a degree of opposition between the interior and the exterior, between the centre and the circumference of the individual which multiplies itself. The production of a new individual exactly resembling the old one, takes place either by sprouting and separation at the extremities; or by evolution from the interior.

By such an evolution of new individuals, the algæ or flowerless water plants, the lichens and fungi continue themselves. The most general description of this process is as follows: the thickening of the contents of an individual cell, or the union and growing together of several such filled cells into one larger kernel, and its separation thereafter from the mother plant, either with or without previous sprouting.

The germ thus freed commences to form a growth downwards, *i. e.* the root, and to this succeeds the growth upwards. More highly organized plants also, which form layers and runners, follow in so doing the same type.

In all these cases, the production of new individuals results from nothing else but a peculiar alteration in consistency, *i. e.* in the form, relative fullness and closer apposition of the cells and vessels, of which the parent individual is constituted.

Sometimes the structure is thickened in particular spots, where the smallest elementary parts press closer to each other. Sometimes it becomes here and there weaker and thinner, and frees itself from its original connections. The separated sprout or the expelled germ immediately commences an independent life of its own, increases in length and breadth, and becomes at last an individual exactly like its parent, which propagates itself in like manner. The whole process, it is true, is subject, like every act of life to a regular order (*Rhythmus.*) It begins at a certain period, and at a certain period is completed; yet the growth and formation of the young individual proceeds in a long uninterrupted continuous course, like the growth and ripening of a fruit. We are therefore entitled to designate the want of distinctly marked periods of development, and the gradual nature of the changes which take place in the mother plant, as an essential character in the process of reproduction in sexless plants.

In reality, such a new formation proceeds always only from the upper growth of a plant, from the stem and the leaves, or a portion of them, in which stem and leaves are organically united, and blended together, (the Thallus.) Never is an individual developed in the same way from the system that grows downwards, that is from the lower parts or the root. Therefore, an individual newly formed in this way, if it is to continue as an independent plant, must now in the last place form of itself its root, which it has not brought into the world with it. If, however, such a sprout, or what is to a certain extent the same thing, a bud, or an eye, is artificially transferred from one plant to another, then it requires no special root of its own, inasmuch as its bed (*sujet*) serves it as such; it unfolds itself only upwards in stem and leaves. We find in this kind of multiplication, that a young plant treated in such a way, agrees completely in all its properties with the parent individual. Thus the eye or graft of a particular kind of fruit-tree develops itself into an exactly similar kind. In this case, the individual is directly multiplied and propagated, and therefore in the manipulation of grafts and eyes, we have a means in accordance with nature, of multiplying the number of noble fruit-trees, in as much as the bad and wild kinds are ennobled *by the part which is artificially introduced.*

All this is quite different, if the multiplication and propagation of plants takes place by means of peculiar sexual organs. In this case, the new individual is by no means merely the product of the separation from the elder plant of a similarly formed part, but much more the result of the opposing influence on each other of two organs, which are quite different from their very beginning—a male fecundating organ, and a female one, which is capable of being fecundated. The result or issue, it is true, agrees in reality with the parent in form and in vital manifestations, but develops itself with greater freedom and individuality, and is therefore less like the older organism than in sexless reproduction. Therefore, as Link has especially mentioned, (Philosoph. Botan. Edit. 1, pp. 405, 407): "Sex in the vegetable kingdom continues not the individual, but the kind." Hence arises the difference between parent and offspring in the vegetable world, and the appearance of varieties and kinds under the influence of different external conditions of life. On this ground, in order to cherish and to propagate the more noble kinds of vegetables, the use of the seed is not indicated so much as the sexless propagation by eyes, grafts, &c. In the case of those vegetables, however, which from the shortness of their lives are not suited for this kind of multiplication, for instance grains, flax, &c. as soon as they begin to degenerate, since we cannot ennoble them, we must replace the seed by better, which has been produced under more favorable external circumstances.

In the most lowly organised plants to which we do not ascribe any sex, we meet with several appearances, which are calculated to prove, that the tendency just indicated, was inherent in their germs of reproduction; namely, to continue especially the individual form of the parent-plant; as for instance in the lichens, which multiply themselves at times by means of germs formed in all parts of the leaf without distinction, at other times by germs which are detached from small shields or apothecia, (which is a somewhat higher organization.)

In the first case, the issue retains more that form, which a special formation of the leaf necessitates; in the latter, it resembles more that in which the leaf almost disappears, and in which the new individual appears almost to consist only of apothecia. The same relation is also very likely at the bottom of the fact, that the mosses propagate their varieties with greater certainty by means of their germs than many other plants of higher organisation, to which we ascribe more developed organs of reproduction, in fact, a sex.

The idea that vegetables have sexes is of great antiquity. We find traces of it in the oldest Greek authors, and since the beginning of the 17th century, the doctrine of the sexes of plants has been taught in Germany, (first by Adam Zaluzianski at Prague, and by R. J. Camerarius at Tubingen.) Every one knows that Linnæus founded his system on the sexuality of plants, and since his time, people have been accustomed to recognise in the stamina of plants the male, and in the pistil, the female organs. In most cases, both of these sexual organs are united in one flower. Since that period, a direct action of the organs on each other for the production of the elements of a new plant, the seed, has been invariably assumed, without people exactly knowing how the act of fecundation was accomplished. The supposition of sexes was in those times chiefly supported by the phenomena of bastards or mules in the vegetable kingdom.

Thus for instance, by artificial generation mules have been produced in the vegetable, as well as in the animal kingdom, and at the present time, many industrious gardeners practice this process, to produce large and long lasting flowers. When we are accustomed to see the formation of bastards take place in the vegetable, under similar conditions to those under which they are formed in the animal kingdom, we are inclined to look on this as the most decided proof of the sexualty of plants. In the mean time, of late years, great progress has been made in unveiling the more hidden phenomena of fecundation, and we have been able, by the aid of well constructed microscopes, to penetrate in our researches regarding vegetable reproduction to the very verge of what our faculties are capable of appreciating. The whole process now lies before us as a complete phenomenon, and it remains for the further researches of the observers of this process, only to examine its numerous varieties according to the different external and internal structure of individual plants.

But in order to take a general view of what is known regarding the organs of generation in plants, it is necessary to cast a general glance over the history of the development of plants.

In the higher vegetables, in the part which is turned away from the earth, and which is developed upwards toward the sun, in short that which is provided with flowers, the growth takes place in two chief directions, in that of length and in that of breadth. The first shews itself in the stem and its parts, the branches and twigs, the second in the leaves. Both these parts are necessary to each other. The stem is the support, it endures, and is lasting; the leaf is that which is born, evanescent, and decaying. The stem displays in its interior formation, *i. e.* its construction from cells and vessels, a great degree of symmetry. The leaves are, as regards their construction from such elementary organs, unsymmetrical. For instance, if one compares a complete section or a regular part of a section of a stem with another one of equal size, cells and vessels will be discovered everywhere in the corresponding portions in like number, size and form, and relative position.

It is different with leaves, since their elementary organs are not exactly in the same proportion on one side, and on the other, when counted by the median plane marked by the midrib, and thus, a section from above downwards shews differences in the number, form, and arrangement of the elementary organs.

The stem placed on the root on which it is supported, is by means of the juices, which are conducted through it, the former and nourisher of the leaves; they, on the contrary, being provided with special respiratory organs, help to increase, prepare, alter and ennoble the sap. From the mutual action of these parts on each other, the nourishment and health of the whole results. The juices which carry the matter capable of being organised, are in the progress of growth worked into solid parts, and the stem, as being the enduring and stronger portion of the vegetable, from year to year increases in mass, while the leaves, after they have for a certain time aided in this process, fall off, and are replaced by new ones. The whole of this system of growth, often containing innumerable members, is ruled by the impulse of self-preservation, so long as flowering does not take place. With the approach of flowering, another higher life is awakened in the plant, which becomes thereafter devoted no longer to the individual, but to the kind. In most cases the flower appears after the leaves, and on the stem and its branches above them.

The process of flowering sets up immediately an action antagonistic to the formation of leaves, in so far, that it impedes or prevents their growth. One might thus say, that two different natures stand upon each other, a lower, one devoted to the parent, and to the existence of the individual; and a higher one, which labours for the future, in as much as it prepares and completes the germ of new individuals. In carrying out, however, this last purpose, the plant makes use of the same organs as if employed in self-preservation, *i. e.* it uses the stem and the leaves, yet in such way, that they become metamorphosed and subservient to the purposes of sexual action. The stem or twig, (the part which especially represents the tendency to growth in length,) is contracted in length and breadth. It becomes pedicle and peduncle. The other chief constituent of the upper growth, the leaf, is changed into anthers and pistil. Of these two parts, the so-named sexual organs of plants, the former exerts the male, the latter the female action. These two altered kinds of leaves form the flower, which is designed by the antagonistical force of its parts to create a new individual, the seed. They, therefore, by their mutual operation, produce the germ or embryo. Between these altered leaves, which are necessary to reproduction, and the green unaltered leaves, we see in most cases a special ring of leaves, which are also transformed, viz. the flower, which is commonly composed of two forms of leaves, the sepals and the petals. They are to a certain degree preparatory forms, meant to introduce the highest and the last and most complete forms and actions in the plant. This whole system of transformed leaves arranged into one wonderful and beautifully arranged mass, the flower, is especially distinguished by a different colour and shape, and by a more delicate structure, from the green leaves; and the stalk, on whose summit it is arranged, differs from the common stalk, in the proportionately smaller mass, and in the greater fineness and tenderness of its structure; in consequence of which, it does not last longer than the fruit, and in comparison with other branches, receives but small woody deposits. The leaves too of the calyx and of the corolla, the anthers and the pistil, are equally real leaves, just as the stalk of the flower is a real branch. Of these parts we can very often satisfy ourselves, from the so-called monstrous flowers, in which we see in different stages the metamorphosis of the leaves into the parts of the flower, or from the case of the stalk, which we see sometimes grow on into a real branch with green leaves.

While in the regular flowering of a plant, each of these transformations of a leaf takes place in a certain order of development, and suddenly and at once; in such irregular cases, we find one or other of the same leaves in different stages of development, as partly green and partly coloured, and the whole succession of the different transformations in like manner disturbed. All this we often observe in cultivated plants, such as tulips and roses. The stalk, however, in the process of formation of a flower does not by any means undergo such varied changes as the leaves; nevertheless it becomes a changed organ. Its most important condition is, as already remarked, that on the appearance of the flower leaves, the tendency to growth in length ceases in its stem and its branches. The stalk, so soon as the flowering process commences with the appearance of the calyx, becomes much shortened and contracted, so that it now only appears a small knot among the leaves of the flower. This is the so-called receptacle. Thus then the stalk or twig completes with the appearance of the flower its growth in length.

But in the real leaves of the flower, the stamina, and the pistil, peculiar alterations take place, which require the appearance of new parts, of which there was not the least indication before. These are the pollen, which has been compared to human semen, and the ova.

These two parts are to be looked upon as the most important portions of the generative organs in plants, and as their special male and female parts; the manner of their origin and of their mutual operation in order to produce offspring, has of late years been investigated with most satisfactory results from the perfection of microscopic observations.

To comprehend more distinctly the process of generation, we must yet cast a glance over the different parts of the leaf. We may assume that the original type of a completely developed green leaf consists of three parts, the vagina, petiole, and lamina. The vagina, is the part by which the leaf is attached to the stem or branch. It embraces a part of the latter, and so far it is concave towards the inside, convex towards the outside. At its upper end, it terminates in the petiole, where all the vessels run closer together, and form a round or half-round body. From this point, the more ramified and finer vessels branch out in different directions, and while they are bound to each other by a few layers of cellular-tissue, they form the upper skin-like broadened portion of the surface of the leaf, the lamina. This surface is, by means of its numerous openings, especially intended for the inspiration and expiration of air and vapours, and for increasing and preparing the nutritious juices. If now the leaf, altered by the higher impulse of reproduction, takes on the nature of a flower leaf, its three organic parts have other functions bestowed on them. The green leaf which is changed into a stamen looses commonly its vagina; its petiole becomes a filament: its lamina is changed into the anthers. In this last part the most important alteration takes place; the cellular tissue which lies between the upper and under surface of the leaf, undergoes a peculiar swelling and puckering up, and the nutritious juice contained in it, runs together in each cell into a few, generally four excessively small granules. These granules get more and more thickened, and form themselves into the pollen. The exceedingly delicate cells, called collenchyma, in which this new formation takes place, are by degrees absorbed, and at last disappear entirely, so that the small globules in the form of a very fine dust lie free between the layers of the anther, until at last after their pouch is torn, they issue out of their cavity, and commence their generative functions as male semen. If this pollen be now examined, we find that its granules, which form innumerable round elliptic or angular bodies, are small bladders formed of a double skin. The outer coat is the stronger, and is frequently evidently composed of very small cells; nevertheless in this case also it is apparently to be regarded as a simple cell, whose surface is strengthened by a net-like thickening. The inner coat touches the other on its inner surface, and is exceedingly delicate, and almost transparent. The outer coat has a considerable power of self-contraction, is at particular points provided with folds or pores, and at times separates itself partially from the inner one. The latter is very thin, and on fecundation issues out at particular places; namely, at the pores or folds of the outer skin. We now easily recognize that it is filled with a very delicate slimy fluid, in which exceedingly minute corpuscles of round or oblong form swim, moving themselves about frequently and actively. This delicate fluid (fovilla) corresponds to the fecundating fluid in animal semen. The inner coat of the pollen granule lengthens itself in the act of fecundation into the form of an exceedingly fine transparent tube, which now continues its growth, until it has reached the part which we view, under the name of the vegetable ovum, as the future depository of the semen.

The ovum, however, is a product of that leaf of the flower, which has arisen in an entirely different way from the stamen, by a transformation of the common leaf, and which is described as the pistil or female organ. By this transformation, the sheath (vagina) of the green leaf becomes the ovarium, or germen. The midrib becomes the style, and the broad part or lamina, which is of the whole comparatively the most drawn together and changed, becomes the stigma. The pistil generally assumes the middle place in the flower, and completes the very wonderful palace of the plant. It is now in the ovaria that the ova develop themselves. They are generally found near the edge of the vaginal part, which we must imagine to ourselves as rolled together inwards, and grown together at its edges along its whole length, so that thereby a cavity is produced in which the ova are situated. This cavity either lengthens itself upwards through the equally hollow style towards the stigma, or it is here shut in by a fine cellular net which fills up the middle of the style.

The stigma, the highest part of the pistil, appears in most cases in a form which differs materially from the broad portion of a leaf, of which it must be regarded as a transformation. It is comparatively the smallest part of the pistil, often looks like a round little knot, and is commonly formed of cells closely packed on each other, without any distinct skin over the surface. The ova which are formed in the cavity of the ovaria, appear at first as very tender conical warts, and consist only of cellular tissue without vessels. We can, however, distinguish in them even before fecundation a cell, which is remarkable among the other ones by its size and shape. This is the so-called embryo sac. The ova themselves are called in this earliest stage the ovules. At their base, that is, where these little cellular warts issue from the pistil, there appear early one or two swollen looking rings, which by degrees lengthen themselves out in the form of a cone-like membrane around the cone-like ovule, and towards its top, and at last only leave its point free and open. At this period the delicate fecundating tube of the pollen granule comes into contact with the ovules, reaching the embryo through the space left open by those thin coverings. This takes place either by the pollen grains falling of themselves on the stigma of the pistil, or by their being conveyed thither by the wind, by insects, or by other causes, by their fixing themselves on the stigma, and by lengthening their delicate fecundating tubes through between the close packed cells of which it consists, down into the cavity of the pistil; or if it also is filled with cellular tissue, down between its individual cells to the ovum. In this process, the fecundating tubes often assume an extraordinary length as compared with their thickness, and in spite of their exceedingly delicate organization, increase with immense rapidity in length.

The cellular tissue in the style and along their course through the fruit downwards to the ova, is exceedingly close, delicate, and moist, and appears to support and nourish the fecundating tubes on their long journey, as they lengthen themselves. The outer membrane or skin of the pollen granule left behind on the stigma, becomes more thin and empty. The fine fluid in the fecundating tubes, in which exceedingly small granules swim, in short the fovilla, shews itself in the liveliest motion during the penetration of the tubes to the ova. When the pollen tube has once arrived at the ovum, it finds the already described embryo sac ready to come into direct contact with it, and thus there probably results a transfusion of the fovilla into the embryo sac. We recognise at least after the pollen tube has entered into that cell; almost constantly, a muddiness in it, which is caused by a thickening of its contents *i. e.* by a cellular deposit. This fact has been observed by many botanists and by myself, and there is no doubt regarding it. According, however, to one observer, Schleiden, this process takes place somewhat differently: for he says, that when it has arrived at the embryo sac, the pollen tube sinks down in it, pushes it before it, and becomes imbedded in it. When the pollen tube has once come to lie in the sac, and when it has swelled out at its further end like a ball or an egg, it is supposed itself to become the new embryo. Regarding this last point, various opinions prevail among physiologists, and most of them have not expressed themselves decidedly on the subject. But supposing Schleiden right, yet so much remains certain, that from the peculiar action of the pollen tube on the cell destined for its reception, it is converted into a seed, in as much as from the organisable contents of the pollen tube and embroyo sac, cellular tissue is gradually deposited and becomes more and more firm. That part of the pollen tube, which lies outside the embryo sac, or at some distance from it, withers up completely, its separated end blends with the embryo sac, or is absorbed and obliterated, and by progressive depositions, the individual parts of the embryo and its encircling albumen are formed.

Those membranous envelopes which had grown round the ovule from beneath upwards, get harder by degrees; this commonly happens in such a way, that the outer forms the external, and the inner the internal, integument. When these coverings close over the top of the ovum which was originally open, and its internal cellular structure developes itself, it becomes completed and is a seed. This process takes place in the vegetable kingdom with great variety, for sometimes more, and sometimes fewer, than two integuments of the skin are developed; the ovule separates itself in the greatest variety of ways, by consecutive layers of cellular tissue raised above each other, and at last escapes from the pistil, now become a fruit, and begins the life of a new independent being. The foregoing are the most important facts in the present state of our researches at least, regarding the generation of plants.

The whole process forces us to the conclusion, that the formation of the seed takes place by means of very opposite antagonistical action in the conditions and organic force of certain parts. Undoubtedly fecundation and its sequelæ take place very differently indeed in plants from the analogous process in animals. In the latter, the whole chain of the sexual process is lost in an organ which cannot be seen. The first beginning of the new animal springs suddenly into shape, while we had not before the slightest trace of it.

On the contrary, in the growth of plants, their vegetable matter is seen by us in its first, as well as its last, moments in corporeal and visible state of action. The union of the organizable matter in the plant with the matter of the pollen tubes, the latter of which manifest their great degree of vitality and plastic power by the immense length to which they grow, takes place so as to be perceptible to our sight with the aid of the microscope. The life of a plant is from its earliest moments visible to us, that of an animal commences where it cannot be seen. For these reasons, one may say, that the formation of a new plant is dependent on the union of two different kinds of vegetable matter, which have been refined by peculiar processes. In this case, the origin of a seed might be looked on as similar to various other appearances in the vegetable kingdom; for instance, to reproduction in some small plants, which are looked on as sexless, and which are formed by several small bladders or nuclei filled with slime, which issue from two different plants, roll themselves together, and unite themselves into a larger nucleus, which has the property of sprouting and of growing into a new individual. On the other hand, this process may also be compared with that which takes place on the large scale, and much more plainly in grafts, eyes, &c. We cannot but acknowledge, that nature in the reproduction of vegetables always acts on the same general plan, and that the process, although from its minuteness verging on the border of what is not appreciable by our senses, yet never passes it.

In this respect the sexual antagonism in plants distinguishes itself from sex in animals. In the animal kingdom, higher mental impulses, such as sensibility, inclination, will, influence sexual intercourse, and the several manifestations do not by any means correspond in their appearance with the growth of the animal, but are all along regulated by a higher nature, and most intimately connected with mental emotions. On the contrary, the process of reproduction in a vegetable can only be looked on as a peculiar kind of growth. The same impulse, which rules vegetable life in all its other manifestations, that of increasing in length and in breadth, also operates from the beginning in the production of a plant. In that part, which we compare to the male organ in animals, an unusual activity in growth lengthwise develops itself. The pollen tube, is, in relation to its excessively small diameter, longer than the highest palm tree, or than any tree of the most gigantic proportions. In the ovum, which we regard as the analogue to the female organ in animals, a tendency to growth in breadth develops itself from the beginning, for it deposits one layer of cells round another, and thus increases the part in its dimension of breadth, just as the stem or branch of a tree does the same by the deposition of yearly rings. According to this view of the matter, the production of a seed is nothing but the peculiar union of growth, longitudinally and laterally in the smallest space, and therefore, so to speak, of little *corporeal* importance, although accomplished by the highest degree of power and vitality. But the new vegetable life is satisfied with its *corporeal* endowments, and does not require more occult ones, it begins and ends with *corporeal* matters. We must nevertheless remark that this process, this many-membered play of the corporeal form, this drama so rich in different acts and transformations, is under the dominion of a power inscrutable to us. From the first production of the infinitely small embryo in the seed of an acorn, till the period when after hundreds of years it stands before us in the gloom of the forest, and its gigantic proportions inspire us with awe, its life, and the life of every vegetable is ruled and directed by a forming mind: and this secret power meets us every where in the vegetable kingdom. It is in action, from its beginning to its end. We acknowledge that here a sublime riddle lies before us, and with reverential awe we draw ourselves back from it, and admire.

If now we are to reduce this whole process of reproduction to its simplest expression, it appears to be the reciprocal action on each other of two peculiarly endowed cells. The cell of the ovule and that of the pollen tube, or extended inner cellular membrane of the pollen granule. The contents of the latter, the fovilla, that exceedingly fine granular mass surrounded with moisture, play here very much the same part as the so-called cellular nuclei do, in the process of growth. That is, a new cell is formed, (which must be admitted, as being the result of the latest investigation), in this way, that one of the small agglomerate mucus-like granules or little balls, the so-called cytoblast, enlarges itself, and becomes a new cell. Thus the production of a new cell falls within the definition of a bud. Or in other cases, several of these little granules appear simultaneouly to expand themselves into cells, and in such a case, their development from an originally simple nucleus may be compared to a separation and division into several parts. The organic elements of plants, by which these changes in growth and increase of substance are produced, are either themselves surrounded by a cell, which in the progress of development is absorbed by the part which grows after it, or they lie, as in the case of the Cambium or formation sap, outside cells that are already formed, environed by mucus and water. Just as we can trace the mode of the organic increase in the cells transformed to wood, so also can we the form and changes of the pollen granules which in their development and sexual functions appear as free and independent cells. But the embryos of sexless plants also develope themselves in a similar way within a larger or parent cell.

Whatever, however, may be the mode in which the pollen tube acts on the cell about to be impregnated (ovule); whether (according to Schleiden) it sinks down with its lower end into the cavity of this cell, or there is only at ransfusion of the pollen into the latter, the life of the elements of the new plants always begins according to the *universal* forms of growth. There is therefore a point of view, from which we can plainly see, that the formation of the new individual is subject to the laws of growth of the vegetable kingdom. This view receives much confirmation from the process of the formation of the embryos or sporules in several cryptogamia, such as fungi and confervæ. The latter plants consist of long cylindrical tubes, which rest on each other like joints. They form new embryos, by bringing into union with each other two neighbouring tubes or threads at points opposite to each other, by means of an intermediate organ, like the step of a ladder, and bring together in this uniting organ their granular contents, and roll them up into a large granule (the gongylus) which at last, when extricated from its tough coverings, is capable of sprouting out in the water, as a new individual.

The comparison of the sexual process in vegetables with the original formation and development of an animal ovum shews us in a surprising way, that in the latter also the process of development, is quite the same. For the animal ovum is also originally a little bladder, provided with a so-called cellular kernel (cytoblast) whose growth begins with the same process of thinning out, and the gradual enlargement of a small granule within it. We may therefore say, with Schwann, that "a common principle of development presides over all the elementary parts of organized things." And the commencement of vegetable formation under the influence of sex, appears to us only as a higher form of the universal process of development. At the same time we are only authorised to recognise in the highest and most complete vital actions, to which plants can raise themselves, that power, which forms them according to a definite form, or if we choose so to call it, the plastic soul.—*Gelehrte Anzeigen, München, Nos.* 136, 137, 138.

Correspondence.

Correction of the erroneous doctrine that the Snow lies longer and deeper on the Southern, than on the Northern aspect of the Himalayas.—By Capt. T. Hutton.

My dear Sir,—Previous to my "Trip through Kunawar" in 1838, I had frequently heard it contended, that the snow lay longer, deeper, and farther down on the *southern* exposure of the Himalaya, than it was found to do on the northern aspect, and this doctrine having been supported by more than one traveller into these regions, has, I believe, at length been received by the scientific world as absolute fact. You may therefore easily imagine my astonishment, when crossing the higher Passes through Kunawur, Hungrung and Pitti (*vulgo Spittee,*) I found the actual phenomena to be diametrically opposed to such a doctrine, and that the northern slopes invariably carried more snow than the Southern exposure.* Not wishing entirely to rely upon my individual observations, I have since applied for information to my friend, Capt. J. D. Cunningham, who being lately deputed on a Political Mission to Thibet, passed a winter in Hungrung, and who fully corroborates my views. I have likewise had access to the late Dr. Lord's notes on the Hindoo Koosh, and find the phenomena observable on that part of the range, to be precisely similar to what I had myself witnessed in Kunawur. Dr. Lord, however, fully relying upon the accuracy of the published information, endeavours to give reasons why the facts of the case should on the Hindoo Koosh, be the reverse of those on the more Eastern Himalaya; but these facts having been misrepresented stand in no need of such explanation, and consequently Dr. Lord's surmise on the subject must fall to the ground. The chief portion of the following notes was contained in my Journal of a trip through Kunawur, &c., furnished to the Asiatic Society, but was for some reason unknown to me, suppressed by the then Secretary, Mr. H. Torrens. As I am inclined to think that the clearing up of the question may be considered of some importance in a scientific point of view, I now send my observations for publication in your Journal. I wish more particularly to call attention to this subject, because it has hitherto gone abroad to the public, that the snow on the Himalaya lies longer and lower down on the southern face, than on the northern; and as both my experience in this matter, and Dr. Lord's remarks on the Hindoo Koosh are directly at variance with this *reputed* fact, I have ventured to quote the above-named gentleman's words, and shall endeavour to remove what I have found to be an erroneous impression.

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* The error we believe originated in the reports of Captain Webb, who surveyed the greater part of the Kemaon, and was adopted by Humboldt, in his celebrated treatise on isothermal lines, who endeavoured to account for it, by the supposed radiation of heat from the elevated plains of Thibet. We have been long conscious of the error here so well pointed out by Captain Hutton, in common with every one who visited the Himalayah.—Ed.

"At the time of our visit," says Dr. Lord, "the snow which on the southern face extended, in any quantity, to a distance of not more than four or five miles, *on the northern, reached eighteen or twenty*, and at a subsequent period, November 9th, when I made an attempt to go into Turkistan by the Pass of Sir Ulung, and met with *no snow until within ten miles of the summit*, it actually on the northern face extended *sixty miles*, or nearly four days' journey. This is a fact which forcibly arrested my attention, as the reverse is well known to be the case in the Himalayan chain, where snow lies lower down on the southern face than on the northern, to an extent corresponding with 4,000 feet in perpendicular descent. But the Himalaya and the Hindoo Koosh have the same aspect; the same general direction; lie nearly in the same latitude, and in fact are little other than integral parts of the same chain. The local circumstances, however, connected with each are precisely reversed. The Himalaya has to the north the elevated Steppes of Central Asia, and to the south, the long low plains of Hindustan. Hindoo Koosh on the other hand, has to the south the elevated plains of Cabul and Koh-i-damun, between five and six thousand feet above the level of the sea, while to the north stretch away the depressed, sunken, and swampy flats of Turkistan."

Now it will readily be seen, that no just parallel can be drawn between the plains of Turkistan and those of the Bengal Presidency, for the latter are not "sunken and swampy flats;" nor will the elevated Steppes of Central Asia, to the north of the Himalaya, bear a moment's comparison with "the elevated plains of Cabul and Koh-i-damun."

Against the long received opinion, that the snow lies deepest on the southern face, I shall merely oppose the few facts which fell under my observation during my journey into Tartary, and now fully corroborated and confirmed by the testimony of Captain J. D. Cunningham. First then, it must be observed, that in the month of June when I crossed the Roonung Pass, the snow lay deepest and farthest down on the northern exposure. On the southern face of the mountains it was first met with at about 12,500 feet of elevation lying in large fields or patches, and uniting at about 13,000 feet into one broad unbroken sheet, from whence to the summit of the Pass, or 1,500 feet more, (the height of the Pass being 14,500,) it continued so, with the exception of about 50 feet at the crest, where on the southern face there was none at all. On the northern slope, on the contrary, it commenced at the very crest of the Pass, and continued in an unbroken sheet for fully two miles and a half, while beyond this for half a mile more, it was broken and lying in patches. The facts observable here are, therefore, greatly in favour of the northern face, for while the extent of snow is there estimated at three miles, that of the opposite exposure is but two thousand feet.

Again, on the Hungrung Pass, rising behind Soongnum, the southern side had far less snow, both in respect to depth and extent than the northern face, down which it stretched nearly to the village of Hungo, or to a distance from the crest of the range of 3,600 feet in perpendicular descent. Again, in Pitti, *(vulgo Spittee)* above Leedung, while the southern exposure of the Pass which rises behind the village to the height of 15,500 feet, was almost entirely free from snow, except immediately at the summit of the range, the whole northern face was buried deeply to some extent.

On my return to Hungrung in July, the northern side still held patches of snow here and there, while the crests of the mountains were covered;—but to the southward not a vestige of snow remained except far down the glen, where from the falling of repeated avalanches from above, a hard and solid mass had become wedged into an arch or bridge across the brawling torrent that descended from the Pass. Opposite to this, and merely divided by the narrow valley in which stands the village of Soongnum, the northern aspect of Roonung still retained a broad and hardened belt of frozen snows along its crest, while to the southward not a trace of it remained. To the right of Soongnum towards Roopah, on the southern cliffs no snow remained at all, while those with the northern aspect were in most parts still deeply buried, as was also the northerly face of Manerung in Pitti.

From these few facts it will appear, that contrary to the usual belief, the snow is retained longer on the northern than on the southern exposure, exactly corresponding with what Dr. Lord observed on the Hindoo Koosh; and why indeed other than such a result should be expected, I am at a loss to divine. The aspects nearly the same; forming part and parcel of the same great range, surely the same phenomena in this respect might naturally be looked for. Taking it for granted, that the hitherto published accounts of these stupendous and interesting hills, were circumstantially to be relied on, Dr. Lord endeavours, with some degree of plausibility, to give the why and wherefore of this difference by stating, that the local relations of the Himalaya and Hindoo Koosh are precisely reversed. The phenomena, however, having been misrepresented, his arguments will not hold good, and besides we shall find that the inferences drawn by Dr. Lord are by no means correct, for although the high steppes of Central Asia stretch away to the northward of the Himalaya, the country immediately to the southward of them by no means corresponds to the low and swampy tracts on the north of the Hindoo Koosh, between which and the plains of Hindustan he would seem to draw a parallel. The mountains south of the true snowy range, although perhaps generally lower than its own elevated and rugged peaks, are still lofty, and considerably exceed the height of Cabul and Koh-i-damun, being for a distance of more than a hundred miles a mere confused series of mountains upon mountains, without any approach to plains or alluvial valleys, such as are interspersed between and characterise the hilly tracts of Affghanistan. Indeed it is moreover a fact, that to the south of the Roonung and Hungrung Passes, there are mountains of a very superior elevation to either of them, as for instance the Giant peaks of Ruldung, rising to the height of 22,000 feet above the sea, and consequently *exceeding them* by about 7,000 feet, or *nearly one-half of their elevation,* while at the same time *they are more than three times the height* of "the elevated lands of Cabul and Koh-i-damun." Thus it is evident, that no parallel can be drawn between the southern hilly aspect of the Himalaya, and the northern swampy flats of Turkistan; for the former actually far exceed in elevation even the southern aspect of the latter mountains. Nor can any fair comparison be made between the northern steppes of the Himalaya and the southern elevated plains of the Hindoo Koosh, for while the steppes of the north are as high *(if not more so)* as a great portion of what appears as the snowy range, the plains of Cabul and of Koh-i-damun are on the contrary not more than one-third of the height of the Hindoo Koosh.

But the same points which are here insisted on as facts are observable at Simla, without travelling even to the snowy range for proofs, for it is notorious to all who have visited the Hills, that the snow lies longest on the northern face of Mount Jacko, than on any other part of it; and in the summer of 1836, after the severe snow storm which the place experienced in spring, snow was procurable on the northern exposure even on the 10th May, while from every other aspect it had disappeared weeks before.

The same facts are well known likewise at Mussoorie, where the northern slopes are invariably longer covered than any others. It may be said in this latter instance, that the proximity to the plains will not permit the snows to lie long upon the southern exposure, and no doubt this is in a great measure true, but it militates only the more against the arguments adduced by Dr. Lord and others, since according to them, the plains are the cause, or rather furnish the causes, which produce the phenomena they contend for, and which I am endeavouring to refute. The southern course of the sun during the season of snows ought also to weigh in favour of my argument, for it can scarcely ever shine upon the northern face during winter for any length of time; and certainly only for the shortest portion of the day even in summer; and, as it is an indisputable fact, that frost commences again in those high regions the moment the sun's rays are withdrawn, or are screened from the northern heights, it stands to reason, and, I repeat, the *fact*, that the snows should lie longer on the northern, than on the southern exposure.

Another argument also in favour of the snow on the northern side, appears to be furnished in the occurrence of dense forests and vegetation along the southern slopes, while they are nearly altogether wanting on the northern face. Whatever may be the cause of this difference, it is certain that where forests and luxuriant vegetation abound, a greater degree of humidity must be engendered than where no vegetation exists, for plants are known to attract humidity; and again the very occurrence of vegetation must prove a degree of moisture in the atmosphere, for without it they could not flourish. Now the damper the climate, the less likely is the snow to be deep, or to lie long, while the drier it is, the less likelihood is there of its melting. Forests, however, not only attract humidity, but exercise otherwise a material influence on the districts in which they occur, by raising the temperature and warding off inclement gales, and therefore snow would continue a shorter time in a well wooded and sheltered country than in one which was comparatively barren. Such should be the case then, in the Himalaya, whose northern and southern aspects correspond in a great measure to such circumstances. The snows too, are known to melt most readily during the period of the monsoon, when they [illegible] dissolved chiefly by the heavy falls of rain. Now the monsoon does not extend to the northern aspect of the Himalaya, and may indeed be said to cease altogether on the Cis-Himalaya, or southern face, not even reaching positively and decidedly to Roonung or Hungrung, although no doubt exercising some influence on them. While the rain therefore would exercise comparatively little influence on the northern snows, the humidity and exhalations which would naturally be induced along the belt of southern forests over which the rain was falling, would operate powerfully in reducing the amount of snow on the Cis-Himalayan exposure.

Although the village of Chini, in Kunawur, has hitherto been considered to be beyond the influence of the monsoon, it is nevertheless *within* it, and on my return from Pitti in July, I fell in with mists and light rains more than two marches beyond that point. Dense mists and clouds came rushing up from the south through the break in the Himalayan chain, caused by the valley or glen of the Sutluj, and these mists had caused the disappearance of all snow from southern aspects, while portions still remained on the north, although daily diminishing in quantity. This continues until towards the conclusion of the monsoon, when falls of snow again commence over the more elevated tracts in September, and accumulate with occasional thaws until the return of summer.

To the foregoing proofs, I shall now add the lately received corroborative testimony of Captain Cunningham. The first communication on the subject was dated from Leo, on the Spittee river, April 6th 1842, and is as follows: "I was at Chooret during the coldest part of the year, about 12,000 feet above the sea, continual snow and blow, but as I was in a ravine I never saw the thermometer at sunrise below *minus* 11°. I have since the middle of February been moving about within small limits, partly for the sake of variety, though that's not much amid a monotonous desolation, and partly for the facility of procuring wood and supplies. In this country a southerly wind and the sun together kept *slopes with a southern exposure*, and 12 and 13,000 feet high, *quite clear of snow*, (except when it was actually snowing,) and this too towards the end of January, and beginning of February, or I may say at all times, (for the gusts of wind were most furious, an[illegible]til I devised certain remedies, I used to be half smothered in my hill tent.) On the northern slopes the snow accumulated, and in narrow dells it may have been hundreds of feet deep. On northern exposures too, extensive slips of pure snow take place, and bury houses and bridges over the Sutlej occasionally, and small streams in hundreds of places. Here I am about 9,000 or 9,500 feet high, wind generally southerly, *no snow whatever on southern slopes within* 15 *or* 16,000 feet, apricot trees budding; but *on northern slopes and in hollows abundance of snow.*"

The second letter is dated from Shalkur on the Pittee river, August 7th, 1842 and is as follows: "About the snow lying longer on the southern slopes of hills (hereabouts) what more can I say? In February (10th and 11th) this year, I made a march of 15 miles from Chooret on the Para to Chungo on the Pittee. *In getting up the northern slopes the snow was, I don't know how deep.* On reaching the summit of a Pass I found no snow, *nor did I find any on the southern slopes;* except in hollow portions or tolerably flat bits. The highest Pass on the road is perhaps 13,500 or nearly 14,000 feet. The effect is attributable partly to the violent southerly winds which blow during December, January and February, and partly to the sun's rays. *In the beginning of May,* in coming from Nako to Chungo in Hungrung, I found *no snow on the southern, eastern or western slopes;* but *on some northern ones which were steep, there was snow three and four feet thick;* elevation about 11,500 feet. At Shalkur up *to the middle of June the snow lay on the northern sides of the gullies or ravines of the hills;* and when out shooting, I have had much difficulty in crossing them; elevation 11,000 to 11,500 feet. I was informed also, that the *northern slopes of the Hungrung Ghat,* between Soongnum and Hungo in Kunawur, *had some snow until the middle of June. On the southern face it had melted six weeks before, except in hollow places.* Just now (August 7th) there is no snow *on western slopes of hills* 17,000 *feet high,* but *there are a few patches on the northern slopes.* The southern and eastern slopes of these particular hills I can't see. You can make what use you please of the above—they are *facts.*"

Thus I think it will now be apparent to any unprejudiced mind, that the hitherto received accounts are erroneous, and that contrary to the usual opinion, ***the snow of the Himalayas lies longer and deeper on the northern,*** than it does on the southern exposure.

Mussooree, 29th March, 1843.

Letter from a Correspondent on the Falco-Rufipedoides, Dhuti-Dhuter of India.

One of your correspondents has requested me to state what are the Indian Falcons, called Dhooti and Karjoona, and whether either of them is the Falco Subbuteo of Europe. In compliance with his request, I beg to state through your *Journal, pro bono publico,* that neither of these Indian names is applicable to Subbuteo, which species seems to be unknown in the plains, and is rare in the hills. In several years I have procured only two specimens, a fine female measured 12 inches and half in length: bill to the gape $\frac{13}{16}$ tail $5\frac{3}{4}$, closed wing $10\frac{3}{8}$. Tarse to sole $1\frac{7}{16}$. Central toe and nail less $1\frac{3}{4}$. Hind $\frac{13}{16}$. Its structure, typical of Falco, and its colours agree with those of the European Subbuteo. Wings equal to tail, with the 2nd quill rather longer than the 1st, which latter alone is notched, and sharply so, about 1[illegible] inch from its tip: tail rounded: tarse bi-scutellate to the front; reticulate to sides and rear: toes long, unequal, slender, typically falconine, with the acropodia almost wholly scutellate. Talons medial, unequal, acute; the inner and hind largest. This bird is blackish, slaty above and rufescent-luteous below: Ears and moustache blackish. Throat and neck in front immaculate: breast and flanks broadly streaked down middle of plumes with blackish; thighs more narrowly: alars and caudals internally with frequent pale bars: bill plumbeous, cere and legs greenish-yellow, claws black.

The Karjoona of India is Falco-Rufipes, distinguished structurally by its devious and small toes and talons, so like to Tinnunculoides. Its wings are equal to its tail, which is full sized and rounded. It is slaty black above, slaty grey below, the belly and vent deep ochreous red, cere and legs orange red: bill yellow horn: talons pale and equal in size. It is from 11 to 12 inches long, wing $8\frac{3}{4}$ to $9\frac{1}{2}$, the female very much resembles Subbuteo in colour, but may be known at once by lesser size, and by its small[illegible] digits and pale equal talons.

The Dhuti (Mas Dhuter) is unknown, I think, to English or other systematic writers, I called it, some years back, Rufipedoides, from its resemblance to Rufipes, which, however, is chiefly in the colours and size: for in structure it most resembles Subbuteo, its peculiar or own specific marks being a short subfurcate tail, and wings very long, exceeding the tail in the quiescent attitude. Its bill is rather larger than that of Subbuteo or of Rufipes, and its feet exceed the size even of those of the former, though otherwise quite like them. In size it is smaller than either of those birds, length $10\frac{1}{2}$ inch (Mas); bill to gape $\frac{13}{16}$: to brow, $\frac{11}{16}$: tail $4\frac{1}{2}$, wing $8\frac{13}{16}$ to 9, tarse $1\frac{3}{8}$. C. toe and nail $1\frac{5}{8}$. Hind less 1. Above, including the whole cheeks, dark slaty blue, below clear ochreous red: alars and caudals internally with 9 to 10 rufescent bars and dark tips, shafts of plumes dark: cere, orbitar, skin and legs reddish yellow, bill plumbeous, nails black and unequal, inner and hind largest.

May, 1843.

Classified Catalogue of Mammals of Nepal, (corrected to end of 1841,* *first printed in* 1832.)

O. Homo Sapiens.—Mass of population belongs to Kalmuc subdivision of the Great Mongolian stirps, with some admixture of Indian stock. In the *Tarai* and low valleys of the hills, are some traces of aborigines of Southern race, like the Bheels, Coles, &c. These latter are denominated Thârû, Denwár, Durre, Manjhe, and Brahmoo. Besides all these, there are some scattered half savage tribes in the Hills, living nearly in a state of nature. They are called Kusoonda-chepânga, Hayoo and Soomvár, and have languages and physiognomy peculiar to themselves. They seem to be the fragments of an aboriginal race of southern origin displaced by the present Transnivean population. That population consists of the following tribes speaking divers and now strongly marked dialects, the Khas, the Magar, the Newar, the Limbu, the Lapcha, the Kirantee, the Cachari, or Cis-Himalayân Bhotia.

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* Reprinted from the Proceedings of the Zoological Society, with corrections and additions up to the end of 1843 by Mr. Hodgson.—J. M.

The languages and forms of these tribes demonstrate their essentially Northern stock or race; but some of them, and most so the Khas, have been much mixed with the Brahmanical or modern Indian family. The Newars also have received a copious infusion from the South. The two historical events which brought the southern into the Sub-Himalayas, are, 1st the persecution of the Buddhists by the Brahmans; 2d of the latter, by the Mahomedans. The Khas are now the dominant and military tribe; the other soldier tribes are the Muggar and Gurung.

N. B.—As to location, the following initial letters signify as follows:—H. is habitat, and G. after it is general, that is, both *Tarai* and all three regions of the hills. L. is lower hilly region. C. is central hilly region, and N. is northern hilly region. T. is *Tarai* and saul forest, or the plains at the base of the mountains. For a general sketch of features and character of the above four regions, see Catalogue as first printed *apud* Journal, Asiatic Society.

QUADRUMANA.

SIMIADÆ.

1. *Semnopithecus necnon Cercopithecus.*—Gen. ch. nobis. Facial angle 45 to 50: face flat: nose short with long narrow lateral nares: limbs long: thumbs small, remote: no cheek pouches: 5th tubercle on last molar present or absent: callosities large: canines variable, large: only in grown males: stomach sacculated and banded as well as intestines: tail very long, commonly tufted, and exceeding the length of the animal. Agile, grave, gregarious, not docile.

1. Sp. new, schistaceus nob. (Nipalensis of former catalogue, see remark at end.) Darker and more uniform in hue than Entellus, and stouter built like Maurus. I think there may prove to be two species.

H. T. and L. more rarely. C. and N. even.

2-3. *Macacus? Pithex,* Nob.—Gen. ch. nob. Facial angle 50: muzzle not elongated. Callosities and cheek pouches large. Buttocks often nude. Structure compacter, but generally like that of Semnopithecus; limbs shorter, thumbs larger, orbits more salient, head rounder, canines similarly variable, nares shorter, rounder and more terminal. Stomach simple. Cœcum and rectum saculated. Tail equal to half the length of the animal. Agile, lively, gregarious, familiar, and docile.

2. Sp. new. Oinops et Pelops, nob.

H. of the first, T. L. and [illegible].—of the second, N.

VESPERTILIONIDÆ.

RHINOLPHINÆ.

4. 8. *Rhinolphus.*—5 Sp. new. Armiger, et Tragatus, et Subbadius, et Macrotis, et Perniger. Nob. H. C. so far as known.

PTEROPINÆ.

9. 10. *Pteropus.*—2 Sp. new. Leucocephalus et Privorus, Nob. The first is alleged to be identical with Medius Auct. H T. passengers in hills.

VESPERTILIONINÆ.

11.15. *Vespertilio.*—5 Sp. new. Formosa, Fuliginosa, Pallidiventris, Muricola, et Labiata Nob. H. C. so far as known.

FERŒ VEL CARNIVORA.

FELIDÆ, *genus*—FELIS, *subgenera.*

16. 22. *Felis.*—7. Sp. Tigris, Pardus, Leopardus, Auct; et Macroceloides, Pardochrous,* Viverriceps et Murmensis, Nob. (Viverriceps is identical with Viverrinus Auct.) Of 1, 2, 3. H. G.; of 4, 5, 7. C.; of 6. T. but Leopards are nearly confined to the hills.

23. *Lynchus.*—1. Sp. new. Erythrotus, Nob. apparently identical with F. Chaus Auct. H. G.

CANIDÆ, *genus*—CANIS, *subgenera.*

24. *Canis.*—1. Sp. domestic, two varieties of the Mastiff and two of the Terrier of Tibet; the Pariar of the plains, and cross-breeds with the first; of 4 first H. N.; of rest, G.

25. 26. *Vulpes.*—2. Sp. Indicus, Nob, et Montanus, Pearson. Indicus is apparently identical with Bengalensis, Necnon Kookri, H. of first T; of second, C. and N.

27. *Sacalius*, Smith, *Oxygoüs*, Nob.—Jackall, 1. Sp. Indicus, Nob. var. of Aureus? H. G. rare in hills. Common in the great populous valley of Nepal proper, seldom seen elsewhere.

28. *Cúön* Nob.—General structure and dentition of Canis, but molars $\frac{6\ 6}{6\ 6}$ only, the 2d tubercular being deficient. Odour and aspect of the last. Head blunter. Tail and ears large. Teats 12 to 14. Venatory, gregarious, does not burrow.

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* These are Macrocetis and Nipalensis of prior Catalogue; but both species appear to be new, and have been so pronounced by excellent authority. The brilliant Pardine hues of the latter are an invariable and distinctive attribute; as also in our Prionodon Pardicolor, its analogue and representative.

1. Sp. Cuon Primævus Nob. type.—Canis Primævus of Bengal. Asiatic Society's Transactions, (subsequently named the type. Chrysæus by Smith.) H. L. C. and N.

MUSTELIDÆ.

VIVERRINÆ.

29. 30. *Herpestes.*—2 Sp. new. Nigula Auct. Griseus, Auct.? et Auropiunctatus Nob. The latter is alleged to be identical with Edwardsi. Auct. H. T. and C. respectively.

*Viverra Auct.** Size large, robust habit, never climbs, thumb not remote, nails obtuse.

31. 2. 2. Sp. new. Melanurus et Civettoides, Nob. H. G.

Viverricula, Nob.—Size small, scansorial, habit vermiform, nails more or less raptorial, and thumb remote, pouch as in Viverra.

33. 4. 2.—Sp. Indica et Rasse Auct. H. T.

35. *Prionodon.*—1. Sp. new. Pardicolor Nobis, H. C. and N.

36. 38. *Paradoxurus.*—3 Sp. new. Hirsutus, Nepalensis, et Lauiger, H. T. C. N. respectively.

N. B.—First possibly identical with Bondar, but has *no* dark lines on the body.

39. *Ailurus.*—[illegible] Sp. Fulgens Auct. the Wah, H. N.

MUSTELINÆ.

40. 4. *Mustela.*—5 Sp. M. Erminea Auct. and four new, viz. Canigula et Sub. Hemachalanus et Calotis et Auriventer vel Cathia, Nob. H. C.

45. *Martes.*—1. Sp. Flavigula Auct. H. C.

46. 47. *Aonyx.*—2. *Sp.* Horsfieldii et Indigitata mihi, H. C. and N.

48. 51. *Lutra.*—4 Sp. Nair Auct. and 3 new. Tarayensis, Monticola, et Aurobrunnea, Nob. H. of first is T.; of 2 next, L. and C.

52. Helictis.—1. Sp. new. Nipalensis, Nob. (alleged to be identical with Helictis moschautus of Gray, and also with Gulo Orientalis of Horsfield.) H. L.

53. *Mesobema (olim Urva) Nob.*—Teeth as in Herpestes, but blunter; structure and aspect precisely mediate between Herpestes and Hilictis. On either side the anus, a large, hollow, smooth-lined gland secreting an aqueous fœtid humour, which the animal ejects posteally with force. No subsidiasy glands, nor any unctuous fragrant secretion. Teats 6, remote and ventral;

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* These are differential characters merely, and are ours. See Viverricula.

orbits incomplete. Parietes of the scull tumid, with small cristæ. Snout elongated and mobile. Subplantigrade.

1. Sp. M. Cancrivora, Nob. type: the Gulo Urva of Asiatic Journal, Nob. H. L. and C. This type is allied to Crossarchus and represents Nasua of America. It is nearer to Hilictis than to Herpestes, all points considered, and belongs rather to the Arctogalidæ than to the Cynogalidæ of H. Smith.

URSINÆ.

54. *Ursitaxus, Nob.*—Molars $\frac{4}{4.}\ \frac{4}{4.}$ of ursine flatness almost on the crown, but the last above transverse, and less than the carnassial tooth. Aspect and size of Taxus. No ears; coarse scant hair; anal glands as in Mydaus. Genital organ bony, and annulated spirally. Typically plantigrade and fossorial. Carnivorous. Teats 4 in a transverse parallelogram.

1. Sp. Inauritus Nob. type H. L.

N. B.—This form I still think is erroneously sought to be identified with Ratelus Mellivorus, alias Mellivora Ratelus of Africa.

55-6. *Ursus.*—2. Sp. Tebetanus et Isabellinus Auct. H. of first is C. second N.

57. *Prochilus.*—1. Sp. Labiatus Auct. H. T.

SORECIDÆ.

58. 60. *Erinaceus.*—3. Sp. Spatangus, Collaris, et Grayii Auct. H. C.

61-4. *Sorex.*—4 Sp. Indicus Auct. et Pygmæus et Soccatus et Nemorivagus Nob. H. G.

65. *Talpa*—1. Sp. new. Micrurus Nob.* H. C. and N.

UNGULATA.

PACHYDERMES.

66. *Elephas.*—1. Sp. Indicus Auct. two varieties. Isodactylus et Heterodactylus Nob. H. T.

67. *Rhinoceros.*—1 Sp. Indicus Auct. H. T.

ANAPLOTHERES.

68. *Sus.*—1 Sp. S. Schophra Auct. the wild Boar, two varieties, Aipomus, et Isonotus Nob. H. G.

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* Specific character uniform velvet black, with silvery grey, gloss iridescent when moist; nude snout feet, and tail, fleshy pink; the last very minute; structure otherwise typical. Snout to rump $4\frac{3}{4}$ inches. Head $1\frac{3}{4}$. Tail $\frac{3}{16}$. Palma and nails $\frac{7}{8}$. Planta and nails $\frac{13}{16}$.

EDENTATES.

69. *Manis.*—1 Sp. new. Auritus Nob. (alleged to be identical with the common Indian type, or Pentadactylus.) H. G.

RUMINANTES.

BOVINÆ.

Genus *Bos*, Subgenera?

70. *Bos.*—Cranium moderate, proportional, or without excess in the cerebral or facial region; frontals shorter than the face, flat, and not broader than long. Occipital plane of the scull quadrangular, never arched along the culminal line, nor indented by the temporal fossæ, smaller much than the frontal plane and forming an acute angle therewith. Horns attached to the highest line of the forehead, rounded, moderate, curved up or down or forward; 13 pairs of ribs; no true dorsal ridge, but sometimes a fleshy hump; dewlap and muzzle large and square. 1 Sp. and type, Bos Domest: Nipalese varieties of. H. G.

N. B.—These Bovine characters are all ours. See Journal Asiatic Soc.

71. *Bibos Nobis.*—Cranium large, massive, exhibiting preponderance of the frontal and cerebral portion over the facial; frontals as long as the face, concave, broader than long, and surmounted by a large salient crest ascending above the highest bases of the horns. Occipital plane of the scull spheroidal, very large, larger than the frontal plane, deeply indented in its centre by the temporal fossæ, and forming an acute angle with the frontal plane. Horns attached below the highest line of the frontals, massive but short, ovoid or subtrigonal, and curving ascendantly; thirteen pairs of ribs; a true dorsal ridge co-extensive with the ribs and terminating abruptly; dewlap and muzzle small; period of gestation longer than in Bos.

1 Sp. and type. Bibos Cavifrons: probably the Bos Gaurus of authors. H. T.

N. B.—Gavæus, an aberrant species leading to Bos? Possibly the 5th type of Bos Genus.

72. *Bison.*—Cranium moderate, depressed, inclining to Bubaline forms in the excess of the facial portion over the frontal, and in the rounding off of the frontals into the occiput; frontals decidedly broader than long, more or less convex, and forming an obtuse

angle with the semi-circular or trigonal occipital plane, which is strongly ridged by the parietes at its summit, is smaller than the frontal plane, and moderately indented. Horns attached rather in advance of the parietal apex of the cranium, small, rounded, curving ascendantly, or out of the horizontal; 14 or 15 pairs of ribs; a true dorsal ridge, but confined to the withers, and terminating posteally in a gradual slope; dewlap none; muzzle small. Types B. Americanus et Pœphagus.

1. Sp. Pœphagus, in Nepal. H. N. and also Tibet.

73. *Bubalus.*—Cranium large, elongate, compressed or narrow, disproportional, exhibiting great excess (a 3rd) in the facial over the frontal or cerebral portion; frontals short, narrow, convex, usually forming an obtuse angle with the occipital plane, which is large and circular in proportion to the obtuseness of that angle, and to the consequent rounding off of the culminal line of separation; parietals merged, not ridged as in the last, nor culmenal. Horns attached to the ends of the highest line of the scull, always exceeding in length that of the cranium, and usually greatly so, depressed, strictly trigonal, and neither ascending nor descending, but directed horizontally backwards; thirteen pairs of ribs; no true dorsal ridge nor fleshy haunch; muzzle large and square; dewlap medial.

1. Sp. and type, Bubalus Arna, fœm. Arnee, two varieties. Macrocerus, et Speirocerus, Nob. H. T.

ANTELOPIDÆ VEL CAPRIDÆ.

74-5. *Antelopa.*—2 Sp. Cervicapra Auct. et Bennettii Auct? Bharatensis, Nob. Vulgo, the Chouka or Ravine Deer. It seems to be identical with Africana Auct. H. T.

76. *Pantholops Nob.*—Molars $\frac{5\ 5}{5\ 5}$ incisors erect, strong and rectilinearly ranged. Horns with clear sinus in cores, long, slender, erect, sublyrate, inserted between the orbits, compressed, nodose, and approximated at their bases. Large inguinal purses. No suborbital sinus. Nose ovine, bluff and hairy. Large intermaxillary pouches or subsidiary nostrils. Knees simple. Ears pointed, short. Tail short, full. Hoofs low, broad and padded with large interdigital pores. Size, habits, and general aspect of Antelopa et Gazella. Females hornless, with lesser inguinal purses, and two teats.

1—Sp. new, and type Antelope Hodgsonii of Abel; the Chiru of Tibet. H. N. transnivem.[*]

77. *Tetracerus.*—1 Sp. Chickara necnon Quadricornis Auct. Chousingha of Hindoos. H. T.

78. *Nemorhœdus.*—1 Sp. Proclivus vel Thâr Nob. H. C. and N. Large interdigital and suborbital sinus.

79. *Kemas.*—1 Sp. Goral Hardw. Large interdig. but no suborb sinus.

80-1. *Capra, wild.*—1 Sp. C. Ibex, Himalayan variety; and tame; two varieties of the common Goat and two of the Shawl Goat; or 1, Sinal; 2, Doogoo; 3, Changra; 4, Chapoo. H of 1, is N.; of 2, 3, C.; of 4, 5, N. and Tibet.

82. *Hemitragus Nob.*—General structure, and odour, habits horns of Capra, but having a small moist muzzle and four teats in the females; no suborbital or interdigital pores. H. N.

1.—Sp. and type, Capra, Quadrimammis vel Jharal Nob. C. Jemlaica of H. Smith?

N.B.—Mr. Ogilby has unwisely confounded this type with his Kemas, the characters of which group were, by the bye, first correctly stated by myself, as were those of Hemitragus. The Goral or type of Kemas has, (besides a larger muzzle than that of Jharal,) interdigital pores; the Jharal or type of Hemitragus has none, wherefore Mr. Ogilby was especially bound by his own principles not to confound the two.[†]

83-4. *Ovis, wild.*—2 Sp. new, Ammonoides Nob et Nahur Nob; and four tame varieties; viz. the Hûnia, Bárwal, Câgo, and Silingia. H. of 1, 2, is N.; of 3, N.; of 4, 5, 6, C.

CERVIDÆ.

Genus Cervus—Subgenera.

85. *Cervus.*—1 Sp. Elaphus of the Saul forest possibly a distinct species, Affinis Nob. Mool or chief. Bara Singha of Hindoos. H. T.

86. *Pseudo-cervus Nob.*—Tail nearly obsolete. Horns branches at the base as in Cervus, above as in Rusa, and qua-drifurcate, size smaller. 1 Sp. Cervus Wallichii Auct. type. Gyana mriga.

N. B.—Alleged to be identical with Affinis, but quite erroneously. H. N.

87. *Rucervus Nob.*—Aspect and size mediate between Elaphus and Hippelaphus. Muzzle remarkably pointed. Horns moderate, smooth,

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[*] Belongs properly to the Zoology of Tibet, of which see separate catalogue lately published.

[†] Horns round, ringed and black, and horns angular, keeled grey and nodose, are yet and certainly diagnostics of the Antelopes and of the Goats, and by these respective marks also are Goral and Jharal assigned to the one and the other group. The intense caprine odour of the Jharal is a most important mark unerringly diagnostic.

pale; one forward basal process on each beam; no median; summit branched as in Elaphus. Canines in males only.

N. B.—These subgeneric characters are ours, and are confessedly frailly based, but not less so than the admitted distinctions. The whole family requires reconstruction.

1—Sp. new, Cervus Elaphoïdes Nob. The Baraiya. H. T. (This is identical with the C. Duvacellii of Cuvier.)

88-90. *Rusa.*—Canines in both sexes. No interdigital pores. Heavily maned. Horns with one basal, and one superior, process thick-dark, and peraled. 3.—Sp. new, Jaraya, et Nepalensis, et Hete, rocerus Nob. Samber and Jerrow.

N. B. Jaraya probably identical with Hippelaphus et Aristotelis Heterocerus, alleged to be so with Niger of Buchanan: but Niger where printed, H. T. and L.

91-3. *Axis.*—3. Sp. 1st Cervus Axis Auct. or Axis Major Nob. 2nd Axis Minor, Lesser spotted Deer Nobis, and 3rd Axis Procinus. Smith H. T. The Chittra, Laghuna and Para respectively.

94. *Stylocerus.* 1 Sp. new, Ratwah, Nob. The Kaker and Barking Deer of Europeans. Probably identical with the insular type or Cervus Muntjac. H. T. L. and C. Interdigital pores in hind feet only.

MOSCHIDÆ.

95-7. *Moschus.*—No interdigital, suborbital and oringuinal pores, caudal and preputial oderiferous glands.—3. Sp. new, Leucogaster, Chrysogaster, et Saturatus, Nob.

N. B.—Saturatus is probably identical with the Moschatus of Linnæus. H. N. and Tibet.

98. *Moschiola.*—1. Sp. new, Mimenoides Nob. Vulgo Bijay. H. T.

SOLIPEDES.

99. *Equus.*—1. Sp. Several small tame Himalayan and Trans-Himalayan varieties. H. N. and Tibet. See Tibet Catalogue.

RODENTIA. MURIDÆ.

100. 5. *Mus, Rats.*—6 Sp. Rattus Auct.? Rottoides Nob. Decumanus Auct.? Decumanoides Nob. Nemorivagus, et Nitidus, et Hydrophilus, et Niviventer Nob. H. C. and N. so far as known.

106. 9. *Musculus Nob. Mice.*—4 Sp. new, Cervicolor, Dumecolus, Nipalensis, et Dubius Nob. H. C. and N. so far as known.

110. 11. *Arvicola? Neotoma?*—2. Sp. new, Pyctoris, et Myothrix Nob. also probably the Hydrophilus introduced above. H. C. and N.

111. *Arctomys.*—1. Sp. new, Himalayanus Nob. H. N. and Tibet.

13. *Rhizomys.*—2. Sp. new, Badius Nob. H. L. and C.

SCIURIDÆ.

114. 16. *Sciurus.*—3. Sp. new, Macruroïdes, Locria, et Locroides Nob. H. L. C. and N. indifferently.

117. 20. *Sciuropterus*—4. Sp. new, Magnificus, et Chrysotrix,* et Senex, et Alboniger. H. L. C. and N. rarely L.

121. *Hystrix.*—1. Sp. new, Nipalensis Nob. Leucurus. Auct. ? H. G.

122. 3. *Lepus.*—2. Sp. new, Aryabertensis, et Oiostolus Nob. H. of 1st, G.; or 2nd N. and Tibet. (Aryavertta, classic name for Hindoos, more proper than Madhyades, which is the locale of our Sp. as Deccan is of Nigricollis. Macrotis better suits another Sp.) Our first Sp. is like Ruficauda, and our second, Tibetanus of Vigne.

N. B.—These are the Indicus, et Quomodius of former catalogue; but several local names are now dropt.

124. *Lagomys.*—1. Sp. Nipalensis Nob. H. N. and Tibet.

In all 124 species, of which probably 55 to 60 are new. Their descriptions, with four or five exceptions only, are to be found in the Journal of Bengal Asiatic Society, and in that of Mr. McClelland. The remaining four or five yet unpublished are forthcoming shortly. The catalogue is considerably enlarged since it was last published in Lin. Trans. A. D. 1838. Some uncertainty still hangs over the intimate structure of the murine animals, but all the rest have been carefully allocated in the modern genera after full examination of their conformation, while their special habitats have been determined upon accurate information.

I have lately seen a critique by Mr. Ogilby of my labours in this department, but I cannot say it is distinguished by much candour. It is well known, that when Mr. Ogilby wrote, several successive catalogues of mine, embodying the improving results of new information, and greater skill in the appreciation of it, existed; and had Mr. Ogilby consulted the whole of these, *according to their dates*, he might have spared a great part of his censorial remarks. Let Mr. Ogilby consult the very first catalogue, and he will find, that most of his identifications of my so-called new species, with others recorded by authors, had been priorly indicated by myself. Let Mr. Ogilby have patience, and he will still find that several of these species are really new. With regard to Semnopithecus Entellus, Papio Rhesus, Cercopithecus Radiatus, Manis Macrourus, Cervus Equinus, not I, but the late Mr. Bennett, is answerable for the errors committed, where such there be, as I have letters of his to prove; and so too, for the misappropriation in reference to Felis Viverrinus. Of that species, my specimens had reached London before Mr. Heath's, and been seen by Mr. Bennett, who had suggested to me the Viverrine likeness, which I was contending was confined to the head; when to my surprise, for Mr. Bennett was in general singularly fair and courteous, suddenly appeared the description of a novelty ascribed to Mr. Heath. Mr. Gray (apud Hardwicke) had meanwhile justly given the discovery of the species to me, though he retained Mr. Bennett's name for it; but as that name conveyed a false analogy, I have chosen to adhere to my own. In short, Mr. Ogilby's critique is rather too much like a comment on the well-known text, "Wo-betide the researcher, who presumes to judge of his own stores."

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* Chrysotrix. MS. General size characters and Colours of magnificus, but with a pale golden yellow stripe down the spine. Senex rather less; of much paler hues chesnut mixed with canescent; head pepper and salt hue since published. See As. Journal.

Extract from the Anniversary Address of the Linnean Society.

"*Aylmer Bourke Lambert, Esq.*, the last survivor of the original members of the Linnean Society, and for nearly fifty years one of its Vice-Presidents, was born at Bath on the 2nd of February, 1761. His father, Edmund Lambert, Esq., of Boyton-House, near Heytesbury, Wilts, married Bridget, daughter of the last Viscount Mayo and his only surviving child, through whom Mr. Lambert inherited the family property and the name of Bourke. He was educated at St. Mary's Hall, in the University of Oxford, and attaching himself early in life to botanical pursuits, joined the Linnean Society at its foundation, and became one of its warmest friends and promoters. In 1791 he also became a Fellow of the Royal Society.

On succeeding to his paternal estate, he was enabled to indulge his taste for botany more freely, and laboured with great ardour and success to increase his herbarium, which at length acquired the character of being one of the most valuable and important private collections in existence. Of this herbarium, and of the several collections from which it was chiefly formed, an account has been given by Mr. Don, who for many years acted as its curator, and who had also charge of Mr. Lambert's extensive botanical library. These collections were at all times most liberally opened by their possessor for the use of men of science, and one day in the week (Saturday) was constantly set apart for the reception of scientific visitors, travellers and others, who either brought with them or sought for information on botanical subjects.

Mr. Lambert's separate publications are two in number: "A Description of the Genus *Cinchona*," London, 1797, 4to. and "A Description of the Genus *Pinus*, London, 1803-24, in two vols. folio. Of the latter work, which is one of the most splendid botanical publications that ever issued from the press, a second edition, with additions, was published in 1828, and a third volume was added in 1834. A small edition, in two vols. 8vo, was also published in 1832.

His other works consist entirely of papers in our 'Transactions.' They are as follows:—

"An account of the *Canis Graius Hibernicus*, or Irish Wolf-Dog.' in vol. ii."

"Anecdotes of the late Dr. Patrick Browne, author of the 'Natural History of Jamaica'," in vol. iv., containing some interesting particulars relative to that intelligent naturalist, from whom Mr. Lambert received and presented to this Society his MS. of a 'Flora Hibernica,' together with a small herbarium, collected in the counties of Mayo and Galway, and a separate collection of Mosses.

"A Description of the Blight of Wheat, *Uredo Frumenti*."

"A Description of *Bos frontalis*, a new species from India," described from a living specimen in the collection of Mr. Brookes, of the New Road.

"Observations on the *Zizania aquatica*," accompanied by a figure from the pencil of Ferdinand Bauer, taken from specimens grown by Sir Joseph Banks in a pond at Spring-grove.

"A further account of *Bos frontalis*," containing numerous particulars of its habits, taken from a Letter written by Mr. Macrae. These four papers are in vol. vii.

"A Description of a new Species of *Macropus (M. elegans)*, from New Holland," from a living specimen in the collection at Exeter Change, in vol. viii.

"Some Account of the Herbarium of Prof. Pallas," in vol. x., which, besides a general account of the collection, then recently purchased by Mr. Lambert, contains characters of a number of new species of plants, which are figured on six accompanying plates.

"Notes relating to Botany, collected from the MSS. of the late Peter Collinson, Esq.," also in vol. x., and affording many interesting notices relating to botanists, gardeners and gardens in England, in the middle of the last century.

"Description of a new Species of *Psidium*" (*P. polycarpon*), which had ripened its fruit at Boyton, in vol. xi.

"Some Account of the Galls found on a species of Oak from the shores of the Dead Sea," and a "Note on the Mustard-plant of the Scriptures," in vol. xvii.

Mr. Lambert's health had for some years been failing, and he had ceased to visit his country-seat at Boyton, but preferred, when out of town, taking up his residence at Kew, where his proximity to the Royal Gardens, and to his friends in town, afforded him more copious sources of enjoyment than he could have found elsewhere. He died at Kew, on the 10th of January in the present year, and his remains were removed to Boyton for interment. He married Catharine, daughter of Richard Bowater, Esq., of Allesley in the county of Warwick, but was left a widower, without any family, some years before his death."

"*Archibald Menzies, Esq.*, who, on the death of Mr. Lambert, became father of the Society, was born at Weem, in the county of Perth, on the 15th of March, 1754. He was early attached to the Botanic Garden at Edinburgh, of which his brother William afterwards had charge; and was enabled, through the kind assistance of Dr. John Hope, then Botanical Professor in that University, who was attracted by his love for natural history and especially botany, to pass through the academical studies necessary for his education as a surgeon. In the summer of 1778 he made a tour, under the auspices of Dr. Hope, through the Highlands and Hebrides, with the view of collecting their rarer plants, to which attention was then strongly directed by the recent publication of Lightfoot's 'Flora Scotica.' He afterwards became assistant to a surgeon at Caernarvon; but soon quitting for a time the practice of his profession on shore, he entered the navy, and became assistant-surgeon on board the Nonsuch, Captain Truscott, in which vessel he was present at the famous victory obtained by Rodney over the Comte de Grasse on the 12th of April, 1782. After the peace of that year he remained for some time on the Halifax station. In 1786 he embarked as surgeon on board the Prince of Wales, a vessel fitted out by the enterprising firm of John and Cadman Etches and Co., and was placed under the command of Lieut. (afterwards Captain) Colnett, of the Royal Navy, for a voyage of commercial discovery to the north-west coast of America. In this voyage he visited Staten Land, where he remained for some time, the Sandwich Islands and China, as well as North-western America, and returned from China by the direct route to England in the beginning of 1789. In the following year he was appointed in the capacity of naturalist, and with the rank of surgeon, to accompany Captain Vancouver, on board the Discovery, in his celebrated voyage; from which, after visiting King George's Sound on the south coast of New Holland, a part of New Zealand, Otaheite and the Sandwich Islands, and exploring by far the greater part of the north-west coast of America, he returned to England in the autumn of 1795. During one of the visits made by this expedition to the Sandwich Islands he ascended Wha-ra-rai and Mowna-roa, two of the principal mountains of the island of Owhyhee, and determined their heights (that of the latter exceeding 13,000 feet) by barometrical observations made simultaneously with others on board the vessel. "Some account" of his ascent of the former was subsequently given by him in the 1st and 2nd volumes of Loudon's 'Magazine of Natural History.' From an early period of the voyage Mr. Menzies added to his duties as naturalist those of surgeon of the Discovery, and it affords a striking proof of his professional skill, that on so arduous a service and in so protracted a voyage, not a single man was lost by disease after quitting the Cape of Good Hope in their passage out.

"From these various voyages Mr. Menzies brought back with him to England large collections of natural history, chiefly botanical. A very considerable number of the plants which he had collected, and especially of the Cryptogamous, to the study of which he was always devotedly attached, were new to science, and have been described from his specimens by Sir James Edward Smith, Mr. Brown, Sir W. J. Hooker and other botanical friends, among whom they were most liberally distributed. His own publications were few in number. In the 1st volume of our 'Transactions' are contained "Description of three new Animals [*Echeneïs lineata*, *Fascoila clavata*, and *Hirudo branchiata*] found in the Pacific Ocean" during his first voyage round the world: and in the 4th, "A new Arrangement of the Species of *Polytrichum*, with some Emendations," which, together with an Appendix, afterwards added, forms a valuable monograph of that extensive genus. In the 'Philosophical Transactions' for 1796, he gave, in conjunction with Mr. (afterwards Sir Everard) Home, "A Description of the Anatomy of the Sea-Otter," of which he had brought home a fine specimen, afterwards presented, with many other zoological specimens, and a set of his plants, to the British Museum.

"He subsequently served in the West Indies as surgeon of the Sanspareil, commanded by Lord Hugh Seymour; but early in the present century he quitted the sea, and continued to practise his profession in London. For some years previous to his death he had retired to Notting Hill, where he passed the tranquil remainder of his lengthened existence, eager to the last to obtain additions to his botanical collection, and enjoying the Society of his numerous friends with a kindness of heart that never failed.

"He died on the 15th of February in the present year, having nearly reached the age of 88, and was buried beside his wife (who died five years earlier, and by whom he had no children,) in the Cemetery at Kensal Green. He left his herbarium, consisting chiefly of Cryptogamous plants, *Gramineæ* and *Cyperaceæ*, arranged with characteristic neatness on paper of an 8vo. size, to the Botanic Garden at Edinburgh, where he had studied; and also gave by his will a bequest of £100 to this Society, of which he became a Fellow on the 19th of January, 1790, and to which he was always most warmly attached.

Among our Foreign Members we have sustained, in common with the whole world of science, a severe loss in the person of.

"*Augustin Pyramus DeCandolle*, a botanist of such distinguished eminence as to demand from us a more than ordinary tribute of respect. Descended from a family which came originally from Marseilles, but had for more than two centuries been settled at Geneva, and which towards the close of the sixteenth century furnished one of that illustrious band of classical printers who united in so high a degree the study of letters with the art of transmitting them to posterity, he was born in the latter city, of which his father had been Premier Syndic, on the 4th of February, 1778. His youthful inclinations were turned towards literature rather than science; but a residence in the country awakened in him a taste for botany, which his attendance on the lectures of Professor Vaucher confirmed, and at the age of sixteen his path in life was determined, and he devoted himself to the cultivation of botanical science.

"In 1795 he paid his first visit to Paris, where he attended the lectures of Cuvier, Lamarck, Fourcroy, Vauquelin, and other distinguished professors; and when Geneva was a few years afterwards incorporated with the French Republic he returned to the metropolis, where he fixed his residence for several years, attending the medical classes and pursuing his botanical studies at the same time under Jussieu and Desfontaines, with both of whom he formed a close and intimate friendship. Soon after taking up his abode in Paris he commenced the publication of his 'Plantarum Historia Succulentarum,' which was speedily followed by his 'Astragalogia;' and in 1802 he began to furnish the text to Redouté's magnificent work, 'Les Liliacées, which he supplied up to the 4th volume. In 1805 he was associated with Lamarck in the third edition of that excellent naturalist's 'Flore Française,' to which he prefixed an introduction, entitled 'Principes Elémentaires de Botanique,' and containing the outlines of a course of lectures which he had delivered in the previous year at the Collège de France. A 'Synopsis Plantarum in Florâ Gallicâ descriptarum' followed in 1806. He had previously, in 1804, connected his medical and botanical studies in an 'Essai sur les Propriétés Médicales des Plantes, comparées avec leur classification naturelle,' of which a second edition appeared in 1816. At an early period of his residence in Paris, D. MeCandolle took an active part in the formation, under the auspices of Baron Benjamin Delessert, of the *Société Philanthropique* for the supply of œconomical soups to the poor and other charitable purposes, of which he continued for several years to be the Secretary. The Society for t[illegible]Encouragement of National Industry, is also stated to have been formed under his direction and management.

"In 1806, he ceased to be permanently resident in Paris. He received in that year a commission from the Imperial Government to collect information on the state of botany and agriculture throughout the empire, and in pursuance of this commission he took for six successive years annual journeys into the several departments, the results of which are contained in his 'Rapports sur les Voyages Botaniques et Agronomiques faits dans les Départmens de l'Empire Fra[illegible]is,' which were published in a collected form in 1813.

"Soon after his appointment to this important task he quitted Paris for Montpellier, where he became Professor of Botany in the Faculty of Medicine in 1807, and a Chair of Botany having been established in the Faculty of Science of that Academy in 1810, he attached himself with renewed ardour to the promotion of his favourite pursuit. Under his direction the Botanic Garden was greatly improved, and a Catalogue, with descriptions of many new species, was published by him in 1813, in which year his 'Théorie Elémentaire de la Botanique' also made its first appearance. Many valuable memoirs, scattered through various publications, but chiefly taken from the 'Annales du Muséum d'Histoire Naturelle,' were in this year collected into a volume.

"After the second Restoration of the Bourbons, circumstances occurred which induced him to quit Montpellier and return to his native city, now restored to independence. A Chair of Natural History was instituted expressly for him, of which he took possession in January 1816, and the Botanic Garden, established towards the close of the last century, with the assistance of funds bequeathed for that purpose by the celebrated Bonnet, was greatly augmented, partly by assistance derived from the Government, and partly by voluntary subscription. Several Fasciculi of the 'Plantes rares du Jardin de Genéve' attest the interest which he took in its success.

"In 1816 he visited England for the purpose of consulting the Herbaria of our country with a view to the general system of plants, the publication of which he then meditated, and during his stay here communicated to the Linnean Society a paper entitled "Remarks on two Genera of Plants to be referred to the Family of *Rosaceæ.*" These are *Kerria* and *Purshia,* previously strangely misunderstood, and as strangely misplaced in distant and very dissimilar families. His memoir on this subject, the only one by M. DeCandolle which has a place in our 'Transactions,' is contained in the twelfth volume.

In 1818 appeared the first volume of his intended 'Regni Vegetabilis Systema Naturale,' which was followed by a second in 1821. But the plan of this work was obviously too vast for accomplishment by individual industry, however great; and after the publication of these two volumes, M. DeCandolle recognized the necessity of confining himself within narrower limits. In the year 1814 he commenced the publication of his 'Prodromus Systematis Regni Vegetabilis,' the title of which indicates his intention at some future period to resume the more extensive work. But even this 'Enumeratio Contracta,' as he designates it, proved too mighty a labour, and the remaining seventeen years of his life, all that his unwearied energy could accomplish was the publication of seven volumes, completing probably about two-thirds of the contemplated task. The value of these important manuals, in the present state of Botanical science, can only be estimated by those with whom they are of necessity in daily use. On many of the more interesting families on which they treat, he simultaneously published a series of descriptive memoirs.

"It is the great merit of this important work, that, far more than any other approaching it in extent, it is founded on actual observation. M. DeCandolle's own herbarium was extremely rich; he had visited and carefully examined many of the most extensive collections, and especially those of Paris; and many entire collections as well as separate families, on which he was specially engaged, were from time to time submitted to his examination by their professors. He had thus opportunities of comparison greatly beyond what in ordinary circumstances fall to the lot of an individual. His library too was stored with almost every important publication that could be required for his undertaking. With such ample materials, aided by his untiring zeal and the persevering energy of his character, he steadily pursued his allotted task, and only ceased to labour at it when he ceased to live.

"It was not merely as a botanist that M. DeCandolle deserved well of his country and of mankind. Both as an individual and in the Council of his native city, he was ever active in the promotion of measures of public utility, whether they related to the improvement of agriculture, the cultivation of the arts, the advancement of public instruction, or the amelioration of the legislative code. Even in his botanical lecture he never lost an opportunity of inculcating the importance of these and similar subjects. Those lectures were attended by a numerous class, who caught from their teacher a portion of the enthusiasm with which he was himself inspired. Some idea of the manner in which he brought their subject before his auditors may be obtained from his 'Organographie' and 'Physiologie Végétale,' published in 1827 and 1832, which contain the substance of his lectures on those two great departments of the science.

"For some years his health had been declining, and it is to be feared that the severe and incessant attention which he paid to the elaboration of the great family of *Compositæ* had made a deep inroad upon it. As a relaxation from his labours, he undertook, in the last year of his life, a long journey, and attended the Scientific Meeting held at Turin; but he did not derive from this journey the anticipated improvement in his health, which gradually failed until his death, on the 9th of September last. He has left a son, Alphonse, well known as the author of several valuable botanical publications, one of which, his memoir on the family of *Myrsineæ*, appeared in our 'Transactions.'"

"*Jens Wilken Horneman* was born in 1770, and studied at the University of Copenhagen, where his 'Forsog til en Dansk œconomisk Plantelære' obtained a prize in 1795. In 1798 he commenced a botanical tour through Germany, France and England, and in 1801 became lecturer at the Copenhagen Botanic Garden. He succeeded his teacher Vahl as Regius Professor and Director of the Garden in 1804, and published in 1807 an 'Enumeratio Plantarum Horti Havniensis, and in 1813 and 1815 a more complete synopsis of the plants there cultivated under the title of 'Hortus Regius Botanicus Havniensis. In 1819 he wrote a dissertation 'De indole Plantarum Guineensium."

After the death of Vahl he superintended the publication of the 'Flora Danica,' and several papers by him have been published in the 'Transactions of the Danish Philosophical Society' and the 'Tidskrift for Naturvidenskaberne,' of which he was one of the editors. His lectures and writings have done much to extend the study of botany in Denmark, and have contributed to maintain the character acquired for Danish botanists by Kœnig, Forskahl, Œder, Rottböll and Vahl."